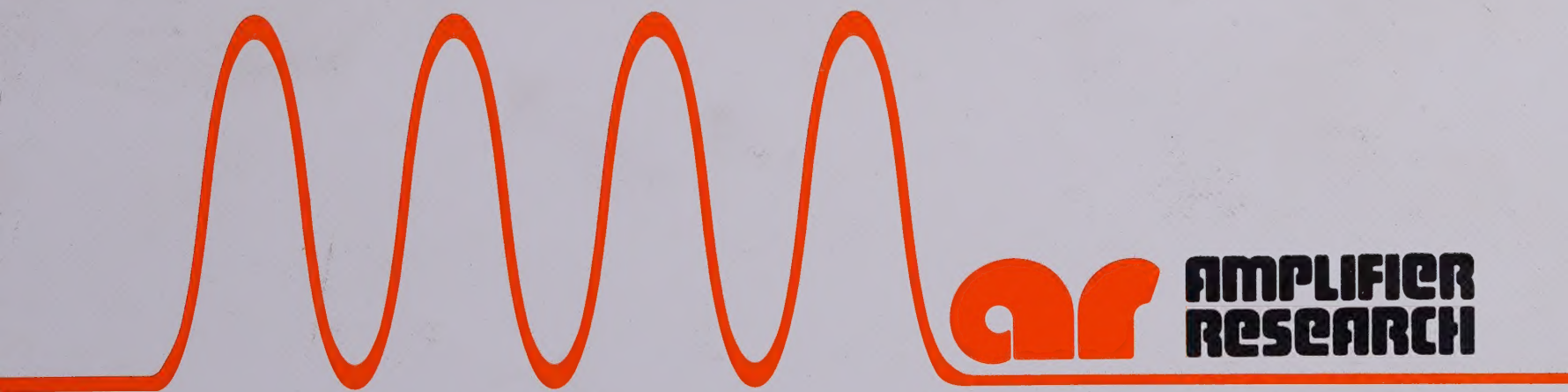

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AMPLIFIER
RESEARCH



Operating and Service Manual

MODEL

120S1G3

PART NUMBER

1010751-501

SERIAL NUMBER

301941

AMPLIFIER RESEARCH
Souderton, PA 18964-9990 USA
TEL 215-723-8181 TWX 510-661-6094 FAX 215-723-5688

⚠ INSTRUCTIONS FOR SAFE OPERATION

BEFORE APPLYING POWER

Review this manual and become familiar with all safety markings and instructions.

Verify that the equipment line voltage selection is compatible with the main power source.

Protection provided by the equipment may be impaired if used in a manner not specified by Amplifier Research.

INTENDED PURPOSES

This equipment is intended for general laboratory use in a wide variety of industrial and scientific applications. It is designed to be used in the process of generating, controlling, and measuring high levels of electromagnetic Radio Frequency (RF) energy. Therefore, the output of the amplifier must be connected to an appropriate load such as an antenna or field-generating device. It is the responsibility of the user to assure that the device is operated in a location which will control the radiated energy such that it will not cause injury and will not violate regulatory levels of electromagnetic interference.

HAZARDOUS RF VOLTAGES

The RF voltages on the center pin of the RF output connector can be hazardous. The RF output connector should be connected to a load before AC power is applied to the amplifier. Do not come into contact with the center pin of the RF output connector or accessories connected to it. Place the equipment in a non-operating condition before disconnecting or connecting the load to the RF output connector.

SAFETY GROUND

This equipment is provided with a protective earth terminal. The main power source to the equipment must supply an uninterrupted safety ground of sufficient size to the input wiring terminals, power cord, or supplied power cord set. The equipment **MUST NOT BE USED** if this protection is impaired.

PHYSICAL DAMAGE

The RF amplifier should not be operated if there is physical damage, missing hardware, or missing panels.

MAINTENANCE CAUTION

Adjustment, maintenance, or repair of the equipment must be performed only by qualified personnel. Hazardous energy may be present while protective covers are removed from the equipment even if disconnected from the power source. Contact may result in personal injury. Replacement fuses are required to be of specific type and current rating.

⚠ INSTRUCTIONS FOR SAFE OPERATION *(CONTINUED)*

SAFETY SYMBOLS



This symbol is marked on the equipment when it is necessary for the user to refer to the manual for important safety information. This symbol is indicated in the Table of Contents to assist in locating pertinent information.



Dangerous voltages are present. Use extreme care.

CAUTION: The caution symbol denotes a potential hazard. Attention must be given to the statement to prevent damage, destruction, or harm.



Indicates protective earth terminal.

RANGE OF ENVIRONMENTAL CONDITIONS

This equipment is designed to be safe under the following environmental conditions:

Indoor use

Altitude up to 2000M

Temperature of 5°C to 40°C

Maximum relative humidity 80% for temperatures up to 31°C. Decreasing linearly to 50% at 40°C.

Mains supply voltage fluctuations not to exceed ± 10% of the nominal voltage or minimum and maximum autoranging values.

Pollution degree 2: Normally non-conductive with occasional condensation

While the equipment will not cause hazardous condition over this environmental range, its performance may vary.

COOLING AIR

Care should be exercised not to block the cooling air inlets or outlets. Cooling air blockage can result in damage to the RF amplifier or intermittent shut-downs.

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SECTION I

GENERAL INFORMATION

1.1 GENERAL DESCRIPTION

The Model 120S1G3 is a self-contained, broadband, microwave amplifier designed for laboratory applications where instantaneous bandwidth, high gain, and moderate power output are required. A **GAIN** control, which is located on the unit's front panel, can be used to decrease the amplifier's gain by 15 decibels (dB) or more. Solid state technology is used exclusively to offer significant advantages in reliability and cost. A Model 120S1G3, when used with a frequency-swept signal source, will provide 120 watts of swept power output from 0.8–3.0 gigahertz (GHz). Typical applications include antenna and component testing, wattmeter calibration, and electromagnetic interference (EMI) susceptibility testing, as well as usage as a driver for frequency multipliers and high-power amplifiers.

Special features incorporated into the Model 120S1G3 include the following:

- A front panel 4-line **vacuum fluorescent display (VFD)** for monitoring amplifier status and forward or reflected output power.
- **Automatic Level Control (ALC)**, which can be controlled by internal circuits or by an external input with front panel control of the ALC Threshold.
- **Pulse input capability.**
- **RF output level protection.**
- **An internal RF detector**, which provides an output for use in self-testing or operational modes.
- **A front panel gain control** for adjusting the amplifier's gain when operating the amplifier in the "Manual" mode.
- Provisions are made for **remote control of all operating functions of the amplifier via IEEE-488 and RS-232 computer protocols**.

Protection is provided by DC current and voltage sensing of each of the final RF amplifier modules.

1.2 SPECIFICATIONS

Refer to the "Amplifier Research Data Sheet" on the following page for detailed specifications.

1.3 POWER SUPPLIES

This unit has three (3) regulated power supplies with a total power consumption of approximately 1050 watts. One supply is a self-contained switching regulated unit with an output voltage of +16.5 Volts Direct Current (VDC). The +16.5VDC output supplies the final RF amplifiers with B+ voltage. A second power supply supplies +24VDC to the unit's cooling fans.

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MODEL 120S1G3
M1, M2, M3, M4
120 WATTS CW
0.8 – 3.0 GHz

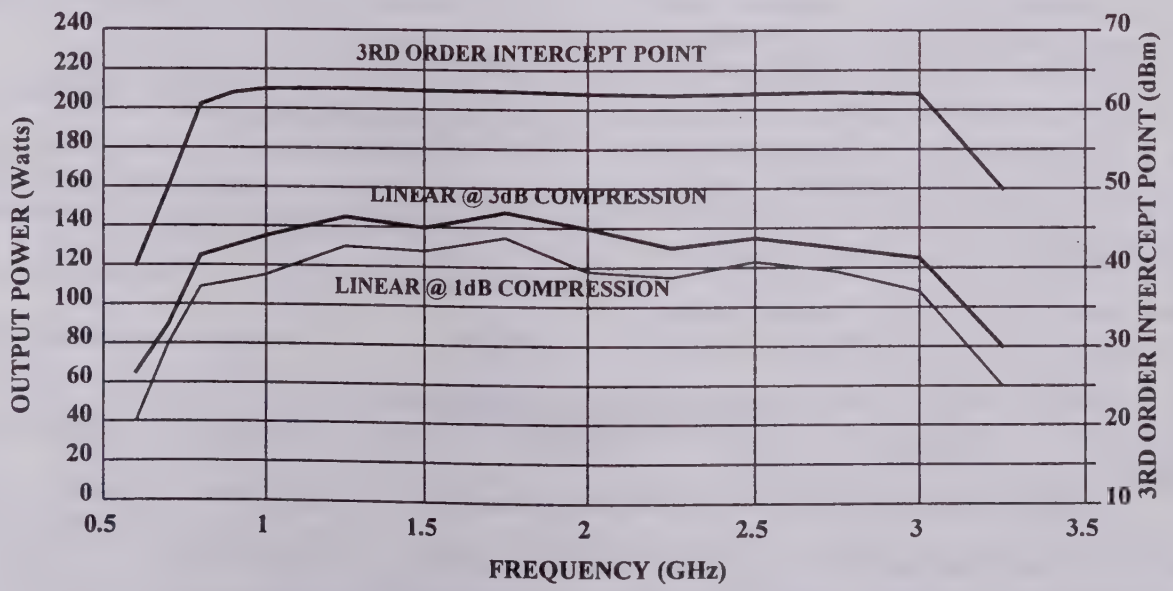
The Model 120S1G3 is a portable, self-contained, air-cooled, broadband, completely solid-state amplifier designed for applications where instantaneous bandwidth, high gain and linearity are required. Push-pull circuitry is utilized in all high power stages in the interest of lowering distortion and improving stability. The Model 120S1G3, when used with a sweep generator, will provide a minimum of 120 watts of RF power.

The Model 120S1G3 is equipped with a Digital Control Panel (DCP) which provides both local and remote control of the amplifier. The DCP uses a digital display, menu assigned softkeys, a single rotary knob, and four dedicated switches (POWER, STANDBY, OPERATE and FAULT/RESET) to offer extensive control and status reporting capability. The display provides operational presentation of Forward Power and Reflected Power plus control status and reports of internal amplifier status. Special features include a gain control, internal/external automatic level control (ALC) with front panel control of the ALC threshold, pulse input capability and RF output level protection. Also included is an internal RF detector which provides an output for use in self-testing or operational modes.

All amplifier control functions and status indications are available remotely in GPIB / IEEE-488 and RS232 format. The buss interface connector is located on the back panel and positive control of local or remote operation is assured by a keylock on the front panel of the amplifier.

The low level of spurious signals and linearity of the Model 120S1G3 make it ideal for use as a driver amplifier in testing wireless and communication components and subsystems. It can be used as a test instrument covering multiple frequency bands and is suitable for a variety of communication technologies such as CDMA, W-CDMA, TDMA, GSM etc. It is also suitable for EMC Test applications where undistorted modulation envelopes are desired.

120S1G3
Typical Performance



REV110999

SPECIFICATIONS
Model 120S1G3

RATED POWER OUTPUT ..... *120 watts minimum*

INPUT FOR RATED OUTPUT ..... *1.0 milliwatt*
..... *maximum*

POWER OUTPUT @ 3dB COMPRESSSION
Nominal ..... *140 watts*
Minimum ..... *120 watts*

POWER OUTPUT @ 1dB COMPRESSION
Nominal ..... *122 watts*
Minimum ..... *100 watts*

FLATNESS ..... *±1.5 dB typical*
..... *±2.0 dB maximum*
..... *± 1.0 dB Internal Leveling*

FREQUENCY RESPONSE ..... *0.8 – 3.0 GHz*
..... *instantaneously*

GAIN (at maximum setting) ..... *51 dB minimum*

GAIN ADJUSTMENT ..... *(Continuous Range)*
..... *15 dB minimum*
..... *(4096 steps remote)*

INPUT IMPEDANCE ..... *50 ohms*
..... *VSWR 2.0:1 maximum*

RF POWER DISPLAY ..... *0 – 150 Watts*

OUTPUT IMPEDANCE ..... *50 ohms, nominal*
..... *VSWR 2.5:1 maximum*

MISMATCH TOLERANCE

100% of rated power without foldback. Will operate without damage or oscillation with any magnitude and phase of source and load impedance. (See Application Note #27)

MODULATION CAPABILITY

Will faithfully reproduce AM, FM, or pulse Modulation appearing on the input signal

THIRD ORDER INTERCEPT

See chart. The third order intercept points for this chart have been determined using two tones spaced 1 MHz apart. This is typical for W-CDMA systems. Closer tone spacing such as 60 kHz generally provides about a 1db to 3db improvement in the IP.

HARMONIC DISTORTION ..... *Minus 20 dbc*
..... *max at 100 watts*

SPURIOUS ..... *Minus 73 dbc Typ.*

PHASE LINEARITY ..... *± 1.0 deg/100 MHz, Typ*

PRIMARY POWER ..... *(Selected Automatically)*
..... *90-132, 180-264 VAC*
..... *50/60 Hz, single phase*
..... *1200 watts maximum*

CONNECTORS
RF ..... *See Model Configurations*
REMOTE INTERFACES
IEEE-488 ..... *24 pin male*
RS-232 ..... *9 pin Subminiature D (male)*
ALC & Pulse ..... *Type BNC on front panel*

SAFETY INTERLOCK ..... *15 pin Subminiature D*

COOLING ..... *Forced air (self contained fans)*

MODEL CONFIGURATIONS

MODEL NUMBER	RF INPUT	RF OUTPUT	WIEGHT	SIZE (W x H x D)
120S1G3	Type N female on front panel	Type N female on front panel	86.2kg (190 lbs)	50.3 x 47.0 x 61.0cm 19.8 x 18.5 x 24.0in
120S1G3M1	Type N female on rear panel	Type N female on rear panel	86.2 kg (190 lbs)	50.3 x 47.0 x 61.0cm 19.8 x 18.5 x 24.0in
120S1G3M2	Same as 120S1G3 with enclosure removed for rack mounting		68.0kg (150 lbs)	48.3 x 44.5 x 61.0cm 19.0 x 17.5 x 24.0in
120S1G3M3	Same as 120S1G3M1 with enclosure removed for rack mounting		68.0kg (150 lbs)	48.3 x 44.5 x 61.0cm 19.0 x 17.5 x 24.0in
120S1G3M4	Type N on front panel.	Type N on rear panel.	86.2kg (190lbs)	50.3 x 47 x 61cm 19.8 x 18.5 x 24in

1.3 POWER SUPPLIES *(CONTINUED)*

The third power supply generates standby voltages of +/-15VDC and +5VDC to operate all front panel controls and remote operation circuitry. DC regulators supply +5V and -5V from the +/-15VDC supplies. Primary circuit protection is provided by circuit breaker CB1 and internal fusing on each of the three power supplies.

1.4 PROTECTION CIRCUITS

Features incorporated into this unit include RF output level protection circuits, thermal protection circuits, and internal DC level sensing and monitoring circuits that sense the voltage on each of the final and driver amplifier modules. Activation of the RF power overload adjustment, (which is adjusted to approximately 100 watts reflected power and 140 watts forward power minimum), will initiate limiting in the low-level driver of the amplifier string and sound an audible alarm. In the event that the limiting circuits cannot keep the amplifier's power levels below the set points, the protection circuits will initiate a shut-down of the A3 One (1)-watt Amplifier, light the fault LED on the front panel, and place the unit into the "Standby" mode. Both forward and reflected power can be continuously monitored on the front panel 4-line VFD. A front panel **RESET** button is also provided to permit re-powering of the amplifier if transient fault conditions occur.

1.5 INSTALLATION

Before proceeding, thoroughly inspect the amplifier for signs of physical damage which may have been incurred during shipment and completely read the following installation and operating instructions, paying special attention to all **CAUTION** notes.

1.5.1 Location

Select an operating location that will permit air to circulate freely around the amplifier's cabinet. The Model 120S1G3 utilizes air cooling and should be located where the normal flow of air into or exiting from the unit will not be restricted, diverted, or re-circulated through the unit itself; in particular, the flow of warm air exiting the rear of the amplifier should not be impeded.

Do not position the unit next to a wall or other equipment that would restrict the flow of air into the bottom of the unit or out of the rear of the unit.

1.5.2 Power

The Model 120S1G3 is designed to operate using AC primary power of 90–264 Volts Alternating Current (VAC), 47–63 Hz single phase, 1200 watts maximum.

⚠ CAUTION:

DANGEROUS VOLTAGES ARE PRESENT IN THE MODEL 120S1G3 WHENEVER THER UNIT IS PLUGGED INTO AN AC OUTLET. ALWAYS DISCONNECT THE UNIT FROM THE MAIN POWER LINE WHEN SERVICING IT. PLEASE NOTE THAT NEITHER THE KEYLOCK SWITCH NOR THE POWER SWITCH WILL COMPLETELY SHUT OFF THE UNIT'S AC POWER.

SECTION II

OPERATING INSTRUCTIONS

2.1 GENERAL

Operation of the Model 120S1G3 broadband amplifier is quite simple. The amplifier's input signal, whether swept or fixed in frequency, is fed into the jack marked **"RF INPUT,"** and the amplifier's output signal is taken from the jack labeled **"RF OUTPUT."** The unit is turned on by activating the front panel **POWER** switch. In the event of a unit malfunction, protection is provided a circuit breaker located on the unit's rear panel.

⚠ CAUTION:

THE MODEL 120S1G3 AMPLIFIER IS NOT CRITICAL IN REGARD TO SOURCE AND LOAD VOLTAGE STANDING WAVE RATIO (VSWR) AND WILL REMAIN UNCONDITIONALLY STABLE WITH ANY MAGNITUDE AND PHASE OF SOURCE AND LOAD VSWR. IT HAS ALSO BEEN DESIGNED TO WITHSTAND, WITHOUT DAMAGE, RF INPUT POWER LEVELS UP TO TWENTY (20) TIMES ITS RATED INPUT OF 1MW. HOWEVER, SIGNAL LEVLES HIGHER THAN 20MW OR TRANSIENTS WITH HIGH PEAK VOLTAGES CAN DAMAGE THE AMPLIFIER. ALSO, ACCIDENTAL CONNECTION OF THE MODEL 120S1G3'S OUTPUT TO ITS INPUT (EITHER THROUGH DIRECT CONNECTION OR PARASITIC FEEDBACK PATHS) WILL CAUSE OSCILLATIONS THAT MAY PERMANENTLY DAMAGE THE UNIT'S INPUT TRANSISTORS.

2.2 CONTROL AND INDICATOR FUNCTIONS

The Model 120S1G3's front panel is shown in **Figure 2-1**; the unit's rear panel features are detailed in **Figure 2-2**.

2.2.1 Keylock Switch

The Keylock Switch is provided for protection from unauthorized use or unexpected remote control of the amplifier. The amplifier can only be controlled from the front panel when the Keylock Switch is in the **LOCAL** position. Likewise, the unit can only be controlled remotely when the Keylock Switch is in the **REMOTE** position. Placing the Keylock Switch in the **INHIBIT** position places the amplifier in standby and prohibits any control of the amplifier.

2.2.2 POWER Switch

The momentary **POWER** switch turns the main power to the amplifier on and off. The status of the green light-emitting diode (LED) in the switch indicates whether the amplifier's power is on or off. The 4-line display is active when power is on.

2.2 CONTROL AND INDICATOR FUNCTIONS *(CONTINUED)*

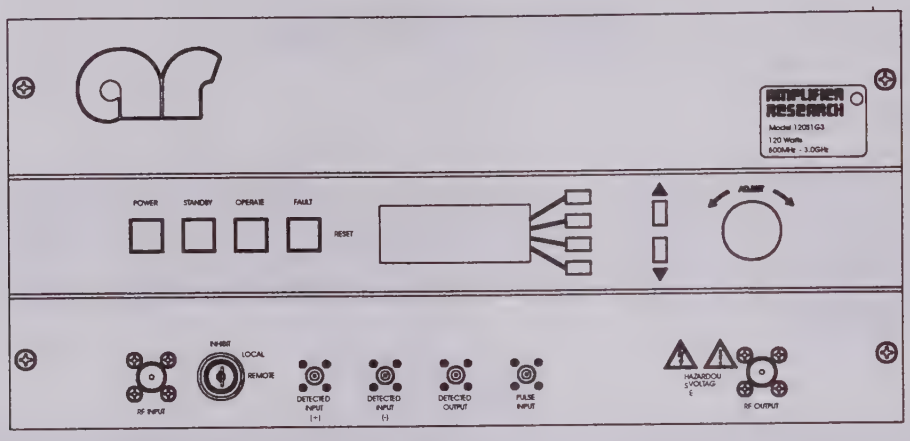


Figure 2-1
Model 120S1G3 Front Panel

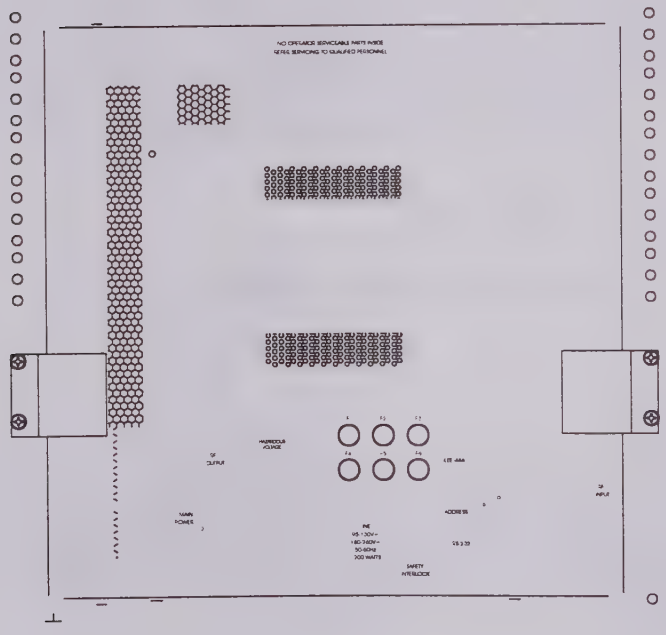


Figure 2-2
Model 120S1G3 Rear Panel

2.2.3 STANDBY Switch

The **STANDBY** switch will place the amplifier in the standby mode from the "Operate" mode; it will not cause a reset to occur. The yellow LED will be lit while then unit is in "Standby"; it will be off only when the amplifier's power is off or when the amplifier is in the "Operate" mode. No RF output is possible when the amplifier is in the "Standby" mode.

2.2.4 OPERATE Switch

The **OPERATE** switch will place the amplifier in the "Operate" mode. While the amplifier is in the "Operate" mode, the green LED will be lit and RF output is possible.

2.2.5 RESET Switch

The **RESET** switch will cause the amplifier to attempt to reset. This red LED in the **RESET** switch indicates a fault in the amplifier. Pressing the **RESET** switch may clear the fault, depending upon the type of fault that has occurred. If the amplifier is in an over-driven condition, lowering the amplifier's gain or ALC Threshold or RF input level should enable the switch to reset the amplifier (i.e., the amplifier will be in the "Standby" mode). If pressing the **RESET** switch does not clear the **RESET** LED, refer to the subsection **3.5** ("Fault Detection/Indicator Circuits") and subsection **4.2** ("Using the Digital Control Panel (DCP) to Aid in Troubleshooting") of this manual.

2.2.6 RF Overload Alarm

This alarm will sound with a loud, piercing, modulated tone if the amplifier's forward power exceeds approximately **180** watts or if the amplifier's reflected power exceeds approximately **120** watts.

2.3 DIGITAL CONTROL PANEL (DCP) OPERATIONS

The operations described in this subsection assume that the user is performing these operations from the amplifier's front panel with the Keylock Switch in the **LOCAL** position. Computer access to command and status functions is also available when the Keylock Switch is set to **REMOTE**. Refer to "IEEE-488 and RS-232 Command and Status Structures" in subsection **2.5.5** for information on remote operation.

The 4-line vacuum fluorescent display (VFD) (see **Figure 2-1**) is located in the center of the amplifier's front panel. The **POWER, STANDBY, OPERATE,** and **RESET** buttons are located to the left of the VFD. The safety Keylock Switch is located to the left of these controls. To the immediate right of the VFD are four buttons in a column with lines leading to the display. These four keys are referred to below as "soft-keys" to denote that the keys perform a different function on each display. To the right of the soft-keys are two additional keys. These are the directional scroll keys, referred to as **UP, DOWN**. To the far right is an adjust knob. This knob is used to adjust most of the variables shown on the display. The adjust knob's sensitivity changes for the different values it adjusts.

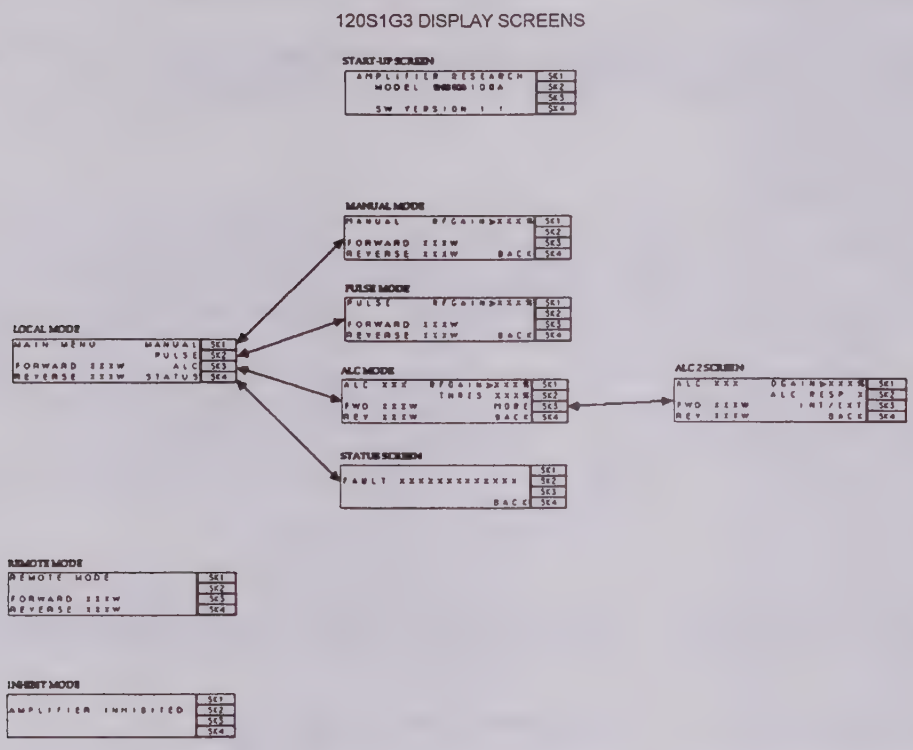


Figure 2-3
Model 120S1G3 Vacuum Fluorescent Display (VFD) Screens

2.3 DIGITAL CONTROL PANEL (DCP) OPERATIONS *(CONTINUED)*

Each menu display is arranged according to a similar pattern. To the right of the display a label is shown which is used to designate both the name of the adjacent soft-key and the variable that is being adjusted. Most displays include the Forward and Reflected power levels on the two bottom-most lines of the display. These indications are developed using a dual-directional coupler located within the amplifier near the RF output port, and should be used as uncalibrated indicators of approximate power level.

The principal operator displays are designated as follows:

- Main—Initial menu;
- Manual—Manual mode selection for setting the RF Output level.
- Pulse—Pulse mode selection for setting the RF Output level of a gated pulse.
- ALC—Automatic Level Control (ALC) mode selection for setting the RF Output level.
- Status—Observe fault details.

Operator Display Functions are described in the following subsections. General Display Navigation is shown in **Figure 2-3**. Movement through the menus is self-explanatory by using the **MORE** and **BACK** soft-keys.

2.3 DIGITAL CONTROL PANEL (DCP) OPERATIONS *(CONTINUED)*

2.3.1 Selecting Amplifier Operating Mode

Before the amplifier is given the "Operate" command, the user should select the desired operating mode. The available operating modes are as follows:

- Manual
- Pulse (External Pulse Input)
- ALC Internal (Automatic Level Control with Internal Detector)
- ALC External (Automatic Level Control with External Detector)

Each of these operating modes is discussed in the following subsections.

2.3.1.1 Manual Mode

In the Manual mode, the amplifier's RF output level is controlled by the input drive level and the RF Gain control. This mode provides no automatic control of the amplifier's RF output level other than that provided by the amplifier's protective circuitry.

To enter the Manual mode, press the soft-key labeled **"MANUAL"** at the Main menu (see **Figure 2-3**); the screen will then change to the Manual display. RF Gain may be adjusted by using the adjust knob or the **UP/DOWN** scroll keys. The Forward and Reflected power levels are shown on the display at all times. Pressing the **BACK** soft-key will always return the screen to the Main menu.

2.3.1.2 Pulse Mode

In the Pulse mode, the amplifier's RF output level is controlled by the input drive level and the RF Gain control. The front panel **PULSE INPUT** can be used to pulse the RF output by applying a pulsed TTL signal; if the pulse is at a low voltage, the RF is off.

To enter the Pulse mode, press the soft-key labeled **"PULSE"** at the Main menu (see **Figure 2-3**); the screen will then change to the Pulse display. The RF Gain may be adjusted by using the adjust knob or the **UP/DOWN** scroll keys. The Forward and Reflected power levels are shown on the display at all times. Pressing the **BACK** soft-key will always return the screen to the Main menu.

2.3.1.3 Automatic Level Control (ALC) Modes

In these modes, the amplifier is operated in an "Automatic Leveling" mode—that is, the amplifier's RF output level is controlled by its **THRESHOLD, RF GAIN,** and **DETECTOR GAIN** controls. The ALC input (feedback) for this mode can be either Internal (**INT**) or External (**EXT**).

2.3.1 Selecting Amplifier Operating Mode *(continued)*

2.3.1.3 Automatic Level Control (ALC) Modes *(continued)*

To enter the ALC modes, press the soft-key labeled **"ALC"** at the Main menu (see **Figure 2-3**); the screen will then change to the ALC display . The **RF GAIN** and **THRESHOLD ALC** parameters may be adjusted by pressing the appropriate soft-key and adjusting the value by using the adjust knob or the **UP/DOWN** scroll keys; an arrow is displayed next to the active selection. The Forward and Reflected power levels are shown on the display at all times. Pressing the **BACK** soft-key will always return the screen to the Main menu. Pressing the **MORE** soft-key displays the second ALC menu. The Detector Gain (**DGAIN**), ALC Response time constant (**ALC RESP**), and Detector selection (**INT/EXT**) parameters may be adjusted by pressing the appropriate soft-key. An arrow is displayed next to **DGAIN** or **ALC RESP** to indicate which one is active. Pressing the **INT/EXT** soft-key will toggle the detector mode, which is displayed on the top line of the display.

2.3.2 Adjusting Amplifier Controls

All adjustments to control the operation of the Model 120S1G3 are made using the dedicated controls, display menus with their associated soft-keys, scroll keys, and adjust knob functionality.

2.3.2.1 RF GAIN Control

The **RF GAIN** control, which has a minimum of 15dB of range, is used to adjust the input level to the preamplifier-leveler module. In the Manual or Pulse mode, this control simply adjusts the output power level for a fixed input power level. In the Automatic Level Control (ALC) mode, this control should be set to allow the amplifier to reach the desired output power.

To adjust the RF Gain, select the operating mode (Manual, Pulse, or ALC) as described above, then press the **RF GAIN** soft-key. Adjust the value using the adjust knob or the **UP/DOWN** scroll keys. Please note that the display panel is limited in resolution compared to the control signals, which are generated and sent to the leveler electronics module. A small rotation that may not show any change on the display may, in fact, cause very small, precise changes in the amplifier's RF output.

2.3.2.2 THRESHOLD Control

This control is used to adjust the output RF signal level in the ALC modes only; leveling will not occur if there is not sufficient RF input power to the amplifier. The **THRESHOLD** control is not used in the Manual or Pulse modes.

To adjust the ALC Threshold, select the ALC operating mode as previously described. Press the **THRESH** soft-key. Adjust the value using the adjust knob or the **UP/DOWN/UP/DOWN** scroll keys. Please note that the display panel is limited in resolution compared to the control signals, which are generated and sent to the ALC Threshold control electronics. A small rotation that may not show any change on the display may, in fact, cause very small, precise changes in the amplifier's RF output.

2.3.2 Adjusting Amplifier Controls *(continued)*

2.3.2.3 DETECTOR GAIN Control

This control is used to compensate for gain variations of the ALC loop caused by differences in the detectors that can be used to provide level feedback to the automatic leveling loop.

To adjust the ALC Detector Gain, select the ALC operating mode as previously described. Press the DGAIN soft-key. Adjust the value using the knob or the **UP/DOWN** scroll keys. Please note that the display panel is limited in resolution compared to the control signals, which are generated and sent to the Detector Gain control electronics. A small rotation that may not show any change on the display may, in fact, cause very small, precise changes in the Detector Gain. For Internal ALC operation, this control should be set to approximately 50%.

2.3.2.4 ALC RESPONSE Control

The **ALC RESPONSE** control is used to adjust the frequency response of the ALC loop. This control is particularly useful if the input to the amplifier is a swept signal. By adjusting the speed of the ALC loop, critical damping-without oscillation-can be obtained. A level of 1 is the fastest time constant and a level of 6 is the slowest.

To adjust the frequency response of the ALC loop, select the ALC operating mode as previously described. Press the ALC RESP soft-key. Adjust the value using the adjust knob or the **UP/DOWN** scroll keys. Higher settings slow the ALC loop response, resulting in a more stable but slower-responding ALC. Note that a large rotation of the knob is required to change settings between the seven available discrete values.

2.3.2.5 Detector Internal/External Selection

The ALC mode can be controlled by either an internal or external detector. To select the desired ALC mode, proceed to the ALC display by pressing the ALC soft-key from the Main menu, then press the **MORE** soft-key. Press the **INT/EXT** soft-key to toggle between the Internal and External ALC modes.

DETECTOR INPUT (+) and **DETECTOR INPUT (-)** connectors are located on the unit's front panel for connection to external detector devices, such as field-strength monitors. Both inputs are enabled in the ALC external (**EXT**) mode.

2.4 INPUTS AND OUTPUTS

The input and output connectors described in the following subsections are located on the unit's front or rear panels; refer to the Front and Rear Panel Features drawings (**Figure 2-1, Figure 2-2**).

2.4.1 RF INPUT

This Type "N" connector is the RF input to the amplifier. It should be connected to an RF signal generator or sweep generator.

2.4 INPUTS AND OUTPUTS *(CONTINUED)*

2.4.2 RF OUTPUT

This Type "N" connector is the RF output of the amplifier.

⚠ CAUTION:

DO NOT CONNECT OR DISCONNECT ANY LOADS OR CABLES FROM THE AMPLIFIER'S RF OUTPUT WHEN THE AMPLIFIER IS IN THE "OPERATE" MODE. DANGEROUS VOLTAGES THAT COULD CAUSE SERIOUS INJURY TO THE USER EXIST AT THE RF OUTPUT WHEN THE AMPLIFIER IS UNDER POWER.

2.4.3 DETECTED OUTPUT

This BNC output provides a Direct Current (DC) output voltage that is proportional to the RF output power of the amplifier. The output voltage is approximately +1VDC for an output power of **100** watts.

2.4.4 DETECTED INPUT (+) (Positive)

This BNC input is used for external leveling of the amplifier. This input is connected to an external detector (e.g., an external directional coupler with a detector or a field-strength meter) when it is desired that some external condition control the amplifier output level. The input should go positive with increasing power level, presenting a voltage in the range of 0–5VDC.

Note: This connection is only active when the amplifier is in the External ALC mode.

2.4.5 DETECTED INPUT (-) (Negative)

This BNC input is used for external leveling of the amplifier. This input is connected to an external detector (e.g., an external directional coupler with a detector or a field-strength meter) when it is desired that some external condition control the amplifier output level. The input should go negative with increasing power level, presenting a voltage in the range of 0–5VDC.

Note: This connection is only active when the amplifier is in the External ALC mode.

Note: A differential input may be applied between the positive and negative detector inputs.

2.4.6 PULSE INPUT

This 50Ω input can be used to gate the amplifier to create RF pulses. A low input reduces the amplifier's gain by [40dB] (minimum). This input is TTL level-compatible. A logical zero (<+0.4VDC) corresponds to no pulse (gain reduced by [40dB]), and a logical one (>+2.5VDC) causes the amplifier to be at full gain as set by the **GAIN** control.

Note: This connection is only active when the amplifier is in the "Pulse" mode.

2.4 INPUTS AND OUTPUTS *(CONTINUED)*

2.4.7 IEEE-488 and RS-232 Interfaces

The Model 120S1G3's IEEE-488 and RS-232 remote interfaces allow remote control, via a computer, of all amplifier functions (except for the Keylock Switch position) that can be controlled from the front panel. When the amplifier is in the "Remote" mode (as determined by the position of the Keylock Switch), a special "Remote" display is shown (see **Figure 2-3**). Front panel controls are deactivated, except for the Keylock Switch, which can be rotated to **LOCAL** or **INHIBIT** in order to prevent remote control commands from being executed.

Refer to "IEEE-488 and RS-232 Command and Status Structures" in subsection **2.5.5** for information on remote operation of the amplifier.

2.4.8 AUX (Interlock) Connector

The **AUX** connector (Interlock) interface provides for an external safety switch interlock that will prevent the amplifier from entering or being placed in the "Operate" mode unless an external connection is made. A connection (<5Ω) between Pins 1 and 8 must be completed to operate the amplifier.

2.5 AMPLIFIER OPERATION

2.5.1 Manual Mode

This subsection describes how the amplifier would be setup and calibrated in the Manual mode. For a block diagram of a typical setup, see **Figure 2-4**, "Typical Setup—Manual or Internal ALC Mode."

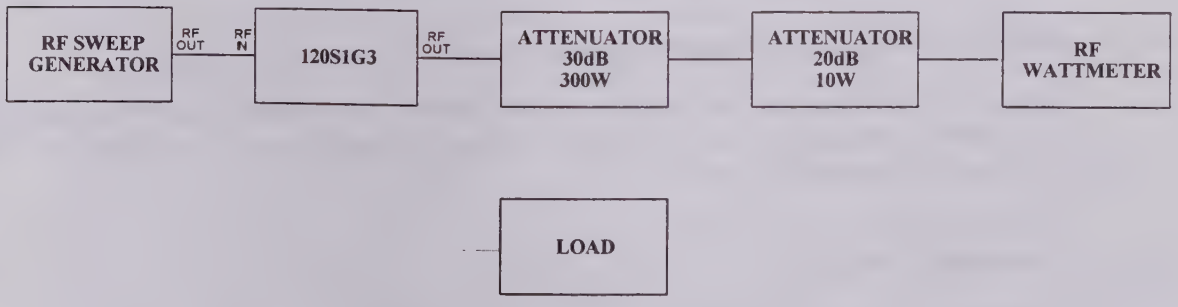


Figure 2-4
Typical Setup—Manual or Internal ALC Mode

2.5.1.1 Preliminary Settings

RF GAIN: 0%

POWER: ON

MODE: MANUAL

2.5 AMPLIFIER OPERATION *(CONTINUED)*

2.5.1 Manual Mode *(continued)*

2.5.1.2 Calibration

Set the RF generator output power to approximately **0dBm** (1mW CW). Place the unit in the "Operate" mode (by pressing the **OPERATE** button). Adjust the manual gain control for the desired signal output level, as measured on the RF wattmeter. You are now calibrated for a given output power from the Model 120S1G3. Place the amplifier in the "Standby" mode (by pressing the **STANDBY** button).

⚠ CAUTION:

DO NOT CONNECT OR DISCONNECT ANY LOADS OR CABLES FROM THE AMPLIFIER'S RF OUTPUT WHEN THE AMPLIFIER IS IN THE "OPERATE" MODE. DANGEROUS VOLTAGES THAT COULD CAUSE SERIOUS INJURY TO THE USER EXIST AT THE RF OUTPUT WHEN THE AMPLIFIER IS UNDER POWER.

2.5.1.3 Connecting the RF Load

You may now disconnect the amplifier RF output from the attenuator and connect it to the test load (dotted line). After the load has been connected to the Model 120S1G3, the amplifier can now be placed in the "Operate" mode by pressing the **OPERATE** button.

2.5.1.4 Repeat the Procedures in Subsections 2.4.1.1 through 2.4.1.3 at Each Test Frequency

2.5.2 Automatic Level Control (Internal Detector) Mode

This subsection describes how the amplifier would be setup and calibrated in the Automatic Level Control (Internal Detector) mode. For a block diagram of a typical setup, see **Figure 2-4**, "Typical Setup: Manual or Internal ALC Mode."

2.5.2.1 Preliminary Settings

POWER:	ON
GAIN:	100%
MODE:	ALC
DETECTOR:	INTERNAL
DETECTOR GAIN:	70%
ALC RESPONSE:	1
THRESHOLD:	0%

2.5.2 Automatic Level Control (Internal Detector) Mode *(continued)*

2.5.2.2 Calibration

Set the RF generator output power to approximately **0dBm** (1mW CW). Place the unit in the "Operate" mode (by pressing the **OPERATE** button). Adjust the threshold control for the desired signal output level, as measured on the RF wattmeter. You are now calibrated for a given output power from the Model 120S1G3. Place the amplifier in the "Standby" mode (by pressing the **STANDBY** button).

CAUTION:

DO NOT CONNECT OR DISCONNECT ANY LOADS OR CABLES FROM THE AMPLIFIER'S RF OUTPUT WHEN THE AMPLIFIER IS IN THE "OPERATE" MODE. DANGEROUS VOLTAGES THAT COULD CAUSE SERIOUS INJURY TO THE USER EXIST AT THE RF OUTPUT WHEN THE AMPLIFIER IS UNDER POWER.

2.5.2.3 Connect the RF Load

You may now disconnect the amplifier RF output from the attenuator and connect it to the test load (dotted line). After the load has been connected to the Model 120S1G3, the amplifier can be placed in the "Operate" mode by pressing the **OPERATE** button. The RF generator can now be placed in the CW or swept mode and the output power will remain constant to within ±1.0dB.

2.5.3 Automatic Level Control (External Detector) Mode

This subsection describes how the amplifier would be set up and calibrated in the Automatic Level Control (External Detector) mode. For a block diagram of a typical setup, see **Figure 2-5**, "Typical Setup—External ALC Mode."

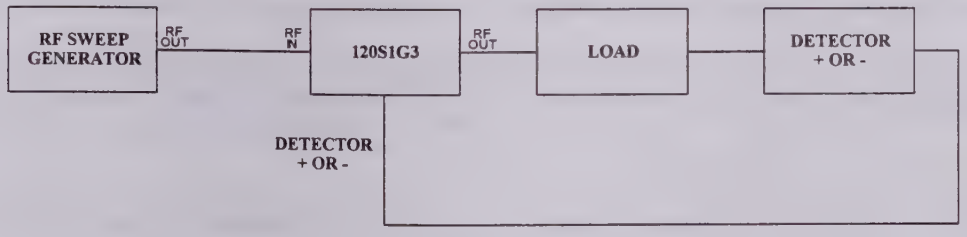


Figure 2-5
Typical Setup—External ALC Mode

2.5.3.1 Preliminary Settings

POWER SWITCH:	ON
GAIN:	100%
MODE:	ALC
DETECTOR:	EXT
DGAIN:	80%
RESPONSE:	4
THRESHOLD:	0%

2.5.3 Automatic Level Control (External Detector) Mode *(continued)*

2.5.3.2 Calibration

Set the RF generator output power to approximately **0dBm** (1mW CW). Place the unit in the "Operate" mode (by pressing the **OPERATE** button). Adjust the Threshold control for the desired signal output level, as measured on the RF wattmeter. You are now calibrated for a given output power from the Model 120S1G3. Place the amplifier in "Standby" (press the **STANDBY** button).

CAUTION:

DO NOT CONNECT OR DISCONNECT ANY LOADS OR CABLES FROM THE AMPLIFIER'S RF OUTPUT WHEN THE AMPLIFIER IS IN THE "OPERATE" MODE. DANGEROUS VOLTAGES THAT COULD CAUSE SERIOUS INJURY TO THE USER EXIST AT THE RF OUTPUT WHEN THE AMPLIFIER IS UNDER POWER.

2.5.3.3 Operation

The RF generator can now be placed in the CW or swept mode and the output power will remain constant to within ±1.0dB. At this time, if the RF generator has been switched to a swept signal the response control can be adjusted to increase the tightness of the ALC loop. The speed of the external detector will determine how fast the ALC loop can be made. For example, if an increase in response time gives no better flatness of the output response, the response control should be decreased to the maximum speed where an improvement in response flatness is observed.

2.5.4 Pulse Mode

This subsection describes how the amplifier would be set up and calibrated in the "Pulse" mode. For a block diagram of a typical setup, see **Figure 2-6**, "Typical Setup—Pulse Mode."

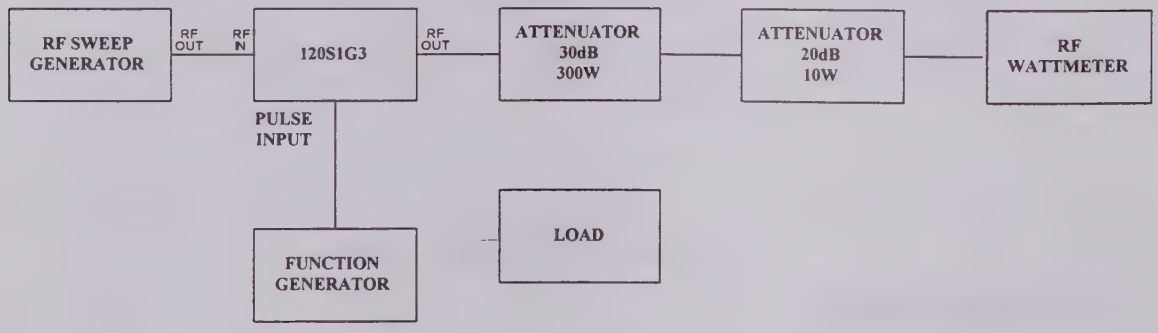


Figure 2-6
Typical Setup—Pulse Mode

2.5.4.1 Preliminary Settings

MANUAL GAIN: 0%

POWER: ON

MODE: MANUAL

2.5.4 Pulse Mode *(continued)*

2.5.4.2 Calibration

Set the RF signal generator's output power to approximately **0dBm** (1mW CW). Turn on the power switch. Place the unit in the "Operate" mode (by pressing the **OPERATE** button). Adjust the manual gain control for the desired signal output level, as measured on the RF wattmeter. You are now calibrated for a given output power from the Model 120S1G3. Place the amplifier in the "Standby" mode (by pressing the **STANDBY** button).

⚠ CAUTION:

DO NOT CONNECT OR DISCONNECT ANY LOADS OR CABLES FROM THE AMPLIFIER'S RF OUTPUT WHEN THE AMPLIFIER IS IN THE "OPERATE" MODE. DANGEROUS VOLTAGES THAT COULD CAUSE SERIOUS INJURY TO THE USER EXIST AT THE RF OUTPUT WHEN THE AMPLIFIER IS UNDER POWER.

2.5.4.3 Connecting the RF Load

At this time the mode switch can be switched to the Pulse mode, and the function generator can be calibrated for the correct pulse length/duty cycle. You may now disconnect the amplifier's RF output from the attenuator and connect it to the test load (dotted line). After the load has been connected to the Model 120S1G3, the amplifier can now be placed in the "Operate" mode by pressing the **OPERATE** button.

2.5.5 Remote Operation

2.5.5.1 Introduction

This subsection describes remote operation of the Model 120S1G3 amplifier by utilizing either the IEEE-488 parallel interface or the RS-232 serial interface and a controlling device, such as a bus controller or a personal computer (PC).

2.5.5.2 Selecting Remote Operation

The Model 120S1G3 can be placed in the remote mode at any time by switching the Keylock Switch on the front panel to the **REMOTE** position. In this mode, control is passed to the selected remote interface, and all front panel controls are inoperative with the exception of the Keylock Switch. The amplifier's initial state will be power off, minimum gain; the front panel display will show the **REMOTE** screen (see Figure 2-3).

2.5.5 Remote Operation *(continued)*

2.5.5.3 Interface Selection

The Model 120S1G3 can be controlled via either the IEEE-488 or RS-232 interfaces. Which interface is active is determined by the position of Switch 6 of the rear panel Dual In-Line Package (DIP) switch located between the two interface connectors. If Switch 6 is in the "on" (1) position, the RS-232 interface will be active. If Switch 6 is in the "off" (0) position, the IEEE-488 interface will be active. (**Note:** These switches are only read at device power-up; in order for changes made in these switch settings to take place, AC power must be removed and then re-applied to the Model 120S1G3.)

2.5.5.4 Interface Set-up

Switches 1–5 of the rear panel DIP switch are used to select either the RS-232 communication (BAUD) rate or the IEEE-488 device address, depending upon which interface is active. (**Note:** These switches are only read at device power-up; in order for changes made in these switch settings to take place, AC power must be removed and then re-applied to the Model 120S1G3.)

2.5.5.4.1 RS-232 BAUD rate selection

The serial communication (BAUD) rate can be set to five different levels. Selections are made by the positions of Switches 1–5 of the rear panel DIP switch. Following is a list of the available BAUD rates and their corresponding DIP switch positions:

BAUD Rate	Switch on (1)
1200	1 only
2400	2 only
9600	3 only
19600	4 only
76800	5 only

(**Note:** Any other combination of switch settings will result in a BAUD rate equal to 1200.)

2.5.5.4.2 IEEE-488 device address selection

The IEEE-488 device address can be set to any number between 1 and 30. This selection is made by setting Switches 1–5 of the rear panel DIP switch to the binary equivalent of the number. **Table 2-1** illustrates this switch selection.

2.5.5 Remote Operation *(continued)*

2.5.5.4 Interface Set-up *(continued)*

2.5.5.4.2 IEEE-488 device address selection *(continued)*

Table 2-1
IEEE-488 Device Address Selection

Device Address	Switch 5	Switch 4	Switch 3	Switch 2	Switch 1
1	off (0)	off (0)	off (0)	off (0)	on (1)
2	off (0)	off (0)	off (0)	on (1)	off (0)
3	off (0)	off (0)	off (0)	on (1)	on (1)
4	off (0)	off (0)	on (1)	off (0)	off (0)
5	off (0)	off (0)	on (1)	off (0)	on (1)
:					
:					
30	on (1)	on (1)	on (1)	on (1)	off (0)

2.5.5.5 Command Set Format

Each command is composed of one alpha character, up to four numeric parameters, and a command termination character. The command termination character is the "line feed" command, which is denoted and entered as <LF>. Commands are case-sensitive and must be entered in upper case only in order to be recognized.

2.5.5.6 IEEE-488 Communications

For IEEE-488 communications, the "End or Identify" (EOI) control line may also be used for command termination. When sending commands to the Model 120S1G3 via the IEEE-488 bus, terminate each command with a <LF>, an EOI, or both. No characters are permitted after the <LF> or EOI; the 120S1G3 interprets characters following the <LF> or EOI as the start of the next command. When an error condition is present at the Model 120S1G3, the "Service Request" (SRQ) line is asserted; the operator can then perform a serial poll operation. The Model 120S1G3's error code (in binary) is contained in the returned serial poll status byte (STB). These error codes are defined in **Table 2-2**.

2.5.5 Remote Operation *(continued)*

2.5.5.6 IEEE-488 Communications *(continued)*

Table 2-2
Remote Error Codes/Messages

IEEE-488 SERIAL POLL POLL RESPONSE (STB) (binary)/decimal	MODEL 120S1G3 ERROR CONDITION	RS-232 ERROR MESSAGE
(01110110) 118	SAFETY INTERLOCK	E1
(01111000) 120	+24 VOLT FAULT	E2
(01111001) 121	-5 VOLT FAULT	E3
(01111010) 122	FWD./REF. POWER FAULT	E4
(01111011) 123	THERMAL LEFT	E5
(01111100) 124	THERMAL RIGHT	E6
(01111101) 125	THERMAL TOP	E7
(01111110) 126	+16.5 VOLT FAULT	E8
(01101111) 111	FUSE/AMP TOP	E9
(01011111) 95	FUSE/AMP RIGHT	E10
(01111111) 127	FUSE/AMP LEFT	E11
(00000000) 0	NO FAULTS	----

2.5.5.7 RS-232 Communications

If the RS-232 interface is active, the Model 120S1G3 will test for a properly connected RS-232 interface when switched into the "Remote" mode. In order for the Model 120S1G3 to recognize an RS-232 connection, the "Data Carrier Detect" (DCD) line must be asserted. This line is sampled continuously in order to determine if the RS-232 connection is broken; therefore, it must remain asserted in order for the RS-232 interface to function. The "Clear To Send" (CTS) line is also used to gate information from the Model 120S1G3. This line must be asserted in order to receive information from the Model 120S1G3. The CTS line can be used as a "handshake" line to inform the Model 120S1G3 when it is permissible to send information. If the CTS line is de-asserted in the middle of a transmission, the character in the process of being transmitted will be completed and further transmission will be halted until the CTS line is re-asserted. The Model 120S1G3 itself asserts two lines: "Data Terminal Ready" (DTR) and "Request To Send" (RTS). The DTR line is continuously asserted, while the RTS line is used to gate information into the Model 120S1G3. Connector pin-out information is given in **Table 2-3**.

2.5.5 Remote Operation *(continued)*

2.5.5.7 RS-232 Communications *(continued)*

Table 2-3
RS-232 Connector Pin-Outs

Pin No.	Signal	Data Direction*	Description
1	DCD	<	Device Carrier Detect
2	RD	<	Receive Data
3	TD	>	Transmit Data
4	DTR	>	Data Terminal Ready
5	GND	N/A	Ground
6	NC	N/A	No Connection
7	RTS	>	Ready To Send
8	CTS	<	Clear To Send
9	NC	N/A	No Connection

***Note:**

>=Output from the Model 120S1G3

<=Input to the Model 120S1G3

Special Note: A null modem cable or adapter is required in order to properly interface the Model 120S1G3 to a standard serial port on a computer.

Once the RS-232 interface is established, commands are processed in the same manner as that of the IEEE-488 interface; the command structure is identical except that there is no EOI line. Therefore, all commands are terminated with a line feed (<LF>). Since this is a full-duplex asynchronous interface, if the Model 120S1G3 detects an error, the error message is immediately transmitted to the host controller. These error messages are defined in **Table 2-2**.

2.5.5.7.1 RS-232 port settings

The RS-232 port settings used for communication with the Model 120S1G3 are as follows.

Word Length: 8 bits

Stop Bits: 1

Baud Rate: 1200–76,800 (switch-selectable)

Parity: None

2.5.5 Remote Operation *(continued)*

2.5.5.8 Remote Commands

The following commands are available to the user for remote communication and operation of the Model 120S1G3. In the descriptions of these commands, a lower-case "x" is used to signify a numeric value or a parameter.

2.5.5.8.1 Power On/Off

Controls the power on/off state of the Model 120S1G3.

Syntax: Px

Parameters: 0=Power Off

1=Power On

Example: To turn the power on, send the following command:

P1<LF>

2.5.5.8.2 Standby

Places the Model 120S1G3 into the "Standby" mode:

Syntax: S

Parameters: None

Example: To place the amplifier into the Standby mode, send the following command:

S<LF>

2.5.5.8.3 Operate

Places the Model 120S1G3 into the "Operate" mode:

Syntax: O

Parameters: None

Example: To place the amplifier into the "Operate" mode, send the following command:

O<LF>

2.5.5.8.4 Reset

Clears faults and resets the Model 120S1G3:

Syntax: R

Parameters: None

Example: To reset the amplifier, send the following command:

R<LF>

2.5.5 Remote Operation *(continued)*

2.5.5.8 Remote Commands *(continued)*

2.5.5.8.5 Manual Mode

Places the Model 120S1G3 into the Manual mode:

Syntax: MM

Parameters: None

Example: To place the amplifier into the Manual mode, send the following command:

MM<LF>

2.5.5.8.6 Pulse Mode

Places the Model 120S1G3 into the Pulse mode:

Syntax: MP

Parameters: None

Example: To place the amplifier into the Pulse mode, send the following command:

MP<LF>

2.5.5.8.7 ALC Mode

Places the Model 120S1G3 into the Automatic Level Control (ALC) mode:

Syntax: MA

Parameters: none

Example: To place the amplifier into the ALC mode, send the following command:

MA<LF>

2.5.5.8.8 Internal Detector

To select the Internal Detector for automatic leveling:

Syntax: DI

Parameters: None

Example: To select the Internal Detector, send the following command:

DI<LF>

2.5.5 Remote Operation *(continued)*

2.5.5.8 Remote Commands *(continued)*

2.5.5.8.9 External Detector

To select an External Detector for automatic leveling:

Syntax: DE

Parameters: None

Example: To select an External Detector, send the following command:

DE<LF>

2.5.5.8.10 RF Gain

Sets the remote gain level of the Model 120S1G3 with 4095 steps of resolution.

Syntax: Gxxxx

Parameters: 0000=Minimum Gain

:

:

4095=Maximum Gain

Example: To set the Model 120S1G3 to Minimum Gain, send the following command:

G0000<LF>

2.5.5.8.11 ALC Threshold

Sets the remote ALC Threshold level of the Model 120S1G3 with 4095 steps of resolution.

Syntax: Txxxx

Parameters: 0000=Minimum ALC Threshold

:

:

4095=Maximum ALC Threshold

Example: To set the Model 120S1G3 to the Minimum ALC Threshold, send the following command:

T0000<LF>

2.5.5 Remote Operation *(continued)*

2.5.5.8 Remote Commands *(continued)*

2.5.5.8.12 Detector Gain

Sets the remote ALC Detector Gain of the Model 120S1G3 with 255 steps of resolution.

Syntax: Dxxx

Parameters: 000=Minimum Detector Gain

:

:

255=Maximum Detector Gain

Example: To set the Model 120S1G3 to Minimum Detector Gain, send the following command:

D000<LF>

2.5.5.8.13 ALC Response

Sets the remote ALC response time constant of the Model 120S1G3 with 7 steps of resolution.

Syntax: LRx

Parameters: 0=Fastest ALC Time Constant

:

:

6=Slowest ALC Time Constant

Example: To set the Model 120S1G3 to the fastest ALC Time Constant, send the following command:

LR0<LF>

2.5.5.8.14 RF Gain Status

To request the present RF Gain setting:

Syntax: G?

Parameters: None

Example: To request the present RF Gain setting, send the following command:

G?<LF>

Responds with **G0000–G4095** (G0000=Minimum RF Gain)

2.5.5.8.15 ALC Threshold Status

To request the present ALC Threshold setting:

Syntax: T?

Parameters: None

Example: To request the present ALC Threshold setting, send the following command:

T?<LF>

Responds with **T0000–T4095** (T0000=Minimum ALC Threshold)

2.5.5.8.16 Detector Gain Status

To request the present Detector Gain setting:

Syntax: D?

Parameters: none

Example: To request the present Detector Gain setting, send the following command:

D?<LF>

Responds with **D000–D255** (D000=Minimum Detector Gain)

2.5.5.8.17 ALC Response Status

To request the present ALC Time Constant setting:

Syntax: LR?

Parameters: None

Example: To request the present ALC Time Constant setting, send the following command:

LR?<LF>

Responds with **LR0–LR6** (LR0=Fastest Time Constant)

2.5.5.8.18 Forward RF Power Status

To request the present RF Output Forward Power reading:

Syntax: FP?

Parameters: None

Example: To request the present RF Output Forward Power reading, send the following command:

FP?<LF>

Responds with **FP0000–FP2048**

P(watts)=(xxxx/2048) X 180

2.5.5 Remote Operation *(continued)*

2.5.5.8 Remote Commands *(continued)*

2.5.5.8.19 Reflected RF Power Status

To request the present RF Output Reflected Power reading:

Syntax: RP?

Parameters: None

Example: To request the present RF Output Reflected Power reading, send the following command:

RP?<LF>

Responds with **RP0000–RP2048**

P(watts)=(xxxx/2048) X 180

2.5.5.8.20 Identity Request

To request the identity of the Model 120S1G3:

Syntax: I?

Parameters: None

Example: To request the identity of the Model 120S1G3, send the following command:

I?<LF>

Responds with **IAR120S1G3SWx**

SECTION III

THEORY OF OPERATION

3.1 INTRODUCTION (REFER TO BLOCK DIAGRAM NO. 1009097)

The Model 120S1G3 Microwave Amplifier consists of a power supply, control circuits, a vacuum fluorescent display (VFD) panel, and Gallium Arsenide (GaAs) Field Effect Transistor (FET) Microwave Amplifier stages.

The signal on input is fed to the A1 Preamplifier/Leveler circuit. The A1 Preamplifier/Leveler circuit has GaAs FET variable attenuators and a GaAs gain stage. The output of the A1 Preamplifier/Leveler circuit drives the A3 One (1)-watt Amplifier. The A3 One (1)-watt Amplifier amplifies the signal by approximately 27dB and drives the A5 Four (4)-watt Amplifier.

The A5 Four (4)-watt Amplifier provides approximately 4dB of gain and drives the A6 Two-Way Splitter.

The A6 Two-way Splitter drives Quadrature-Coupled Amplifiers ("Quad Amps") A7 and A8. These amplifiers have approximately 8dB of gain and provide approximately 8 watts of output power. The output of the A7 and A8 Quad Amps drives the A9 and A10 Two-Way Splitters.

The outputs of the A9 and A10 Two-Way Splitters drive Quad Amps A11–A14. Each of these Quad Amps drives a Four (4)-Way Splitter (A15–A18).

The outputs of the A15–A18 Four (4)-Way Splitters provide 16 outputs to drive the 16 Quadrature-Coupled Output Modules (A19–A34).

The output of the A19–A34 Quadrature-Coupled Output Modules are combined in the A35 16-Way Combiner to provide a minimum of 120 watts of output power.

The output of the A35 16-Way Combiner is fed to the Directional Coupler, which is part of the A36 Directional Detector Assembly. The Directional Coupler is used to monitor the forward and reflected power output of the amplifier for leveling, for the unit's front panel VFD forward and reflected power displays, and for protection of the amplifier.

The A36 Directional Coupler's output is fed to the Model 120S1G3's **RF OUTPUT** connector.

3.2 RF AMPLIFIER OPERATION

3.2.1 A1 Preamplifier/Leveler (Schematic Diagram No. 1009228)

The RF input signal is fed to the A1 Preamplifier/Leveler, RF attenuators U1 and U2. U1 and U2 are GaAs FET attenuators. DC signals between approximately -0.5V to -2.0V are used to control the shunt and series legs of the RF Attenuators. These attenuators are used for manual gain control using the front panel **GAIN** control or for remote gain control, and for leveling using internal or external signals.

The Inductor-Capacitor (LC) networks on the input form high-pass filters that are used to attenuate low-frequency, out-of-band signals.

3.2 RF AMPLIFIER OPERATION *(CONTINUED)*

3.2.1 A1 Preamplifier/Leveler (Schematic Diagram No. 1009228) *(continued)*

GaAs FET Q1 is the first stage of gain in the amplifier. Transistor Q3 controls the drain current through GaAs FET Q1. The output of Q1 is fed to the A3 One (1)-watt Amplifier.

Integrated circuit (IC) U3A provides a DC signal to the series element of the U1 and U2 RF attenuators. U1 and U2 have minimum attenuation when the control signal is at approximately -12.5V, with maximum attenuation (minimum gain) occurring with 0V on the control input.

3.2.2 A3 One (1)-watt Amplifier (Schematic Diagram No. 1010591)

The A3 one (1)-watt amplifier is assembled on a Teflon®/glass printed wiring board (PWB). It has three (3) GaAs FET gain stages. Each stage is input and output DC isolated by coupling capacitors. Resistive feedback is used from the drain to the gate of the GaAs FET to decrease the low-frequency gain. Shunt capacitive stubs are used to tune the amplifier. The drain of Q4 is matched to the output using a tapered transformer.

The GaAs FETs are operated in a depletion mode. They will conduct the maximum DC current with 0V bias on their gates and are normally operated with approximately -1V to -4V on their gates.

3.2.3 A4 Bias Control Circuit (Schematic Diagram No. 1010902)

The A4 bias control circuit controls the DC drain current of the three (3) FET stages in the A3 One (1)-watt Amplifier by varying the gate voltage of the RF stages. The A4 bias control circuit has a -5V input and a +16.5V input from the power supply.

All of the bias control circuit's stages operate in a similar manner; therefore, only the operation of the Q4 stage is described herein.

PNP transistor Q4 (2N3906) is used to control the DC current through the A3Q3 FET in the A3 One (1)-watt Amplifier. A reference voltage of 9.5V is established on the base of Q4 with the voltage divider network R7 (3.0K) and R12 (2.2K). There is a 18Ω resistor from the 16.5V line to the emitter of Q4 and also to the drain of A3Q3 in the A3 One (1)-watt Amplifier. Q4 will operate normally with approximately 10.2V on the emitter; this will occur with approximately 370mA through the 18Ω resistor R8. If the current through A3Q3 decreases, the drop across R8 will decrease, thereby increasing the emitter voltage of Q4; this will cause Q4 to conduct more, which will cause the gate voltage of A3Q4 to become more positive, which will cause A3Q3 to conduct more, thereby returning the voltage at the emitter of Q4 to 10.2V.

3.2 RF AMPLIFIER OPERATION *(CONTINUED)*

3.2.4 A5 Four (4)-watt Amplifier (Schematic Diagram No. 1009543)

U1 is a voltage regulator set to 13.5V output with a current limit of approximately 2 amps. Transistor Q1 turns off voltage regulator U1 when the -5V supply voltage falls below approximately -3.5V. PNP transistor Q2 regulates the DC current through GaAs FET Q3 by sensing the voltage drop across 3Ω resistor R8 and then varying the negative gate voltage to Q3, thereby maintaining the Q3 drain current at approximately 1 amp. The DC operation of Q3 can be monitored by measuring the voltage on test point TP1 of the A5 One (1)-watt amplifier; the normal voltage is approximately 10.9VDC. The module has a gain of approximately 4dB and can supply approximately 4 watts of RF power.

3.2.5 A6, A9, and A10 Two-Way Splitters

The A6, A9, and A10 Two-Way Splitters are multi-section, broadband Wilkinson splitters. The input signal is split into two equal amplitude, equal phase signals. The amplitude of each signal is 3–3.5dB below the input signal when both outputs are terminated in 50Ω loads.

3.2.6 A7, A8, A11–A14, and A19–A34 Quadrature-Coupled Amplifiers ("Quad Amps") (Schematic Diagram No. 1009163)

IC U1 is a voltage regulator set to 13.5V output with a current limit of approximately 2.2 amps. Q1 turns off the voltage regulator when the -5V supply voltage falls below approximately -3.5V. PNP transistors Q2 and Q5 regulate the DC current through Q3 and Q4, respectively, by sensing the voltage drop across 2.7Ω resistors R5 and R16 and varying the negative voltage on the gates of Q3 and Q4, thereby maintaining the drain current at approximately 1 amp. The DC operation of Q3 and Q4 can be checked on test points TP1 and TP2 without removing the unit's lid. The normal voltage on TP1 and TP2 without RF drive is 10.9 ±0.4V.

U2 and U3 are 90° quadrature couplers. U2 splits the input signal into two signals with a phase difference of 90°. U3 combines the RF outputs from Q3 and Q4 and is connected to the output connector, J2. Two 50Ω termination resistors (R17 and R18) absorb any difference signals and help to improve the input and output Voltage Standing-Wave Ratio (VSWR) of the module. The module has a gain of 7.5dB or greater and delivers approximately 8 watts of RF power.

IC U4 is a voltage comparator that is used to sense a voltage fault at the drains of Q3 and Q4. The output of U4 will go low if either of the drains of Q3 or Q4 is above approximately 12.5V or below approximately 7.5V, thereby causing LED DS1 to be illuminated.

3.2.7 A15, A16, A17, and A18 Four-Way Splitters

The A15, A16, A17, and A18 Four-Way Splitters are multi-section, multi-stage broadband Wilkinson splitters. The input signal is split into four equal amplitude, equal phase signals. The amplitude of each signal is 6–6.5dB below the input signal when the four outputs are terminated into 50Ω loads.

3.2.8 A35 16-Way Combiner

The 16-Way Combiner is a radial input, stepped transformer, impedance-matched combiner. When the outputs of the 16 amplitude- and phase-matched Quad Amps are fed to the 16-Way Combiner, the resulting combined output will be approximately 12dB above the output of a single amplifier module.

3.2 RF AMPLIFIER OPERATION *(CONTINUED)*

3.2.9 A36 Directional Detector Assembly

The A36 Directional Detector Assembly consists of a 50dB dual-directional coupler and two detectors. The input of the A36 Directional Detector Assembly connects to the output of the A35 16-Way Combiner; its output is fed to the Model 120S1G3's **RF OUTPUT** connector. The output from the detectors is fed to the Model 120S1G3's Level Control Board.

3.3 POWER SUPPLY

For reference, see Schematic Diagram Number **1009611**, "Wiring Diagram, Model 120S1G3."

Line power to the unit can be either 95–130 VAC or 180–260 VAC. A 15-amp circuit breaker (CB1), which is located on the rear panel, protects the unit in case of a short. A power relay (K1) delivers line voltage from the circuit breaker to the self-contained switching power supplies, which supply +16.5VDC to the Quadrature-Coupled Amplifier modules and +24VDC to the unit's cooling fans. The power relay (K1) is controlled by the front panel VFD assembly via the Model 120S1G3's Fault Detection board.

3.4 CONTROL CIRCUITS

3.4.1 Control Circuits

This subsection describes the internal operation of the Model 120S1G3's controls. Assume that CB1 is closed and the unit is in the power-off mode. At this time all power supplies are off except the high-reliability, low-voltage, "keep-alive" power supply. This power supply provides power to the control printed circuit boards (PCBs) within the Model 120S1G3.

When the A37 power switch is activated, Relay K1 on the A41 Regulator Board closes, supplying ±15VDC to the Level Control Board and the Preamplifier/Leveler circuit. +5VDC is supplied to the Fault Detection Board, and -5VDC is supplied to all of the Quad Amps, the A5 Four (4)-watt Amplifier, and the A3 One (1)-watt Amplifier.

When the **OPERATE** switch is activated, Relay K1 on the A40 Fault Detection Board closes, supplying power to close the AC line relay (K1) in the power supply, applying AC to the input of the +24VDC power supply (PS2), starting the cooling fans and supplying AC to the input of the +16.5VDC power supply (PS1), supplying power to the Quad Amps, the A5 Four (4)-watt Amplifier, and the A3 One (1)-watt Amplifier.

An RF overload will remove DC power from the A3 One (1)-watt Amplifier and will illuminate the fault LED. Operation of the amplifier can be resumed by reducing the RF signal level and pressing the **RESET** switch. Safety Interlock faults, Thermal Faults, and -5VDC faults will turn off the AC power to the Model 120S1G3's DC power supply.

The unit's front panel VFD will list the corresponding fault on the STATUS screen; once the problem has been corrected, the amplifier can be reset and returned to the "Operate" mode. The VFD assembly is a multiprocessor-controlled microcontroller that is not serviceable without access to the proper logic analyzer, emulator, and computer source code. Except for visual inspection of the VFD assembly and its cabling, and connectors, no in-field debugging of the VFD is possible.

3.4 CONTROL CIRCUITS *(CONTINUED)*

3.4.2 A38 Level Control Board

This subsection describes the operation of the Model 120S1G3's Level Control Board. For reference, see Schematic Diagram Number **1009958**, "Level Control Circuit." In general, the A38 Level Control Board performs the following functions:

- Provides automatic level control of the amplifier's output when the amplifier is placed in the Automatic Level Control (ALC) mode.
- Limits RF input level to the amplifier and turns on the audio alarm when forward or reflected power levels exceed specified levels.
- Sends a fault signal to the fault control board when the limiting previously described has failed to control the output power. This signal ultimately turns off power to the final amplifiers.
- Drives the forward and reflected indicators on the front panel and remote computer hosts.
- A pulse input signal from the front panel control is also used to provide pulsed output from the amplifier.

The above functions are described electrically below.

Voltages are received from the directional coupler located on the amplifier's output, which are proportional to the amplifier's forward and reflected power levels. These voltages are amplified by U1 to provide +1VDC at pin 1 and pin 2 with an input proportional to the 120-watt level.

From pin 1, the forward signal voltage is picked up by four buffer stages. The buffer U2B is calibrated to drive the front panel indicator for forward power. U2A is used as a buffer to control the leveling preamplifier in the "ALC—Internal Detector" mode of operation. U2B drives the detected output connector on the front panel; the other buffer (U2C) is not used. The fifth opamp, U7A, contributes to the RF overload protection circuitry.

The reverse power path is identical to the forward signal flow.

The buffer U5 drives three separate circuits to provide RF overload protection, and it is driven by either U4 (forward) or U9 (reflected), whichever is more positive. U5 drives U6 and U7, comparators for the audio alarm and the overload fault detector, respectively.

The outputs of U7 are diode ORed, which drive and protection loop integrator, which limits the maximum amount of forward or reverse power outputted by the amplifier. The output of this integrator is ORed with gain control and ALC control signals through U11, which controls the attenuator of the leveling preamplifier, and can be brought low by its strobe input, which is driven by Q2 and the pulse input.

If the forward or reverse limit circuit (U6) becomes active, an audio alarm will sound, warning the operator.

3.4 CONTROL CIRCUITS *(CONTINUED)*

3.4.2 A38 Level Control Board *(continued)*

The Automatic Level Control (ALC) circuitry takes its input from either the internal source U2/A, via a switch (U13) (Internal ALC) or from either the + or - inputs on the front panel (External ALC). These voltages drives the differential amplifier U14, whose output is sent to the digital potentiometer U4.. The threshold voltage sent to ALC loop integrator U3 is sent from the display assembly via U8. The ALC gain is adjustable via U12 and the front panel display. U11 drives the attenuator in the preamplifier-leveler assembly, thereby completing the ALC loop. The pulse input drives the attenuator in the preamplifier-leveler to provide pulse control of the amplifier via Q3, Q2, and the strobe input of U11.

3.5 A40 FAULT DETECTION/INDICATOR CIRCUITS

This subsection describes the function and theory of the fault detection/indication circuits that protect the Model 120S1G3 from damage. For reference, see Schematic Diagram Number **1009692**, "Fault Control Assembly."

3.5.1 Thermal Faults

Thermal protection is provided by a thermal switch on each of the final amplifiers. These switches are connected in series and are normally closed. When any switch senses a temperature higher than its predetermined value, it opens, and this will cause a "High" signal to appear at the thermal sensor's input to the fault control board. This input is polled by the onboard microcontroller and sent to the VFD assembly to be indicated on the front panel VFD. Any fault puts the unit into the "Standby" mode until it is reset.

3.5.2 RF Overload Faults

An RF overload fault would be detected on the level control board, which sends a corresponding signal to the fault control board. This signal is polled and displayed on the front panel.

3.5.3 Final RF Amplifier Faults

Protection from over-dissipation in the FETs of the final RF amplifiers is provided by the current-limiting circuits located on each of the 22 Quadrature-Coupled Amplifiers. If any one of the Quadrature-Coupled Amplifiers' DC sensing circuits detect a high or low voltage, a fault signal is sent to the Fault Control Board, a fault indication is displayed on the front panel, and the DC power is removed from the A3 One (1)-watt Amplifier.

3.5.4 Low-Voltage Faults

Low-Voltage Fault detection is provided by comparators that monitor the -5VDC, +16.5VDC, and +24VDC power supplies. A low-voltage output that is outside of its "normal" range will send the unit into "Standby" and will display the fault on the front panel VFD's STATUS screen. Once a fault has been detected and the problem has been rectified, pressing the **RESET** switch will reset the unit, and normal operation of the amplifier can be resumed.

3.5 A40 FAULT DETECTION/INDICATOR CIRCUITS *(CONTINUED)*

3.5.5 Interlock Fault

An interlock connector is provided on the Model 120S1G3's rear panel. The unit will be taken out of the "Operate" mode and DC voltage will be removed from the final amplifiers if there is an open between pin 1 and pin 8 of the interlock connector; if this happens, the front panel VFD will read **INTERLOCK FAULT**.

3.6 FRONT PANEL CONTROLS

This subsection is a brief description of the Model 120S1G3's front panel controls; it includes only an electrical and interconnect description. For a functional description of these controls, refer to **Section II** of this manual. For reference, see Schematic Diagram Number **1009611**, "Interconnect Diagram, Model 120S1G3.

SECTION IV

MAINTENANCE

4.1 General Maintenance Information

The Model 120S1G3 is a relatively simple instrument that should require very little maintenance. It is built with printed wiring boards (PWBs) and solid state components in order to ensure long, trouble-free life. However, should a malfunction occur, special care must be taken when servicing the unit in order to avoid damage to the solid state components or the PWBs.

Since the unit's solid state components are soldered in place, substitution of components should not be resorted to unless there is some indication that they are faulty. In addition, when troubleshooting, care must be taken to avoid shorting amplifier voltages. Small bias changes may cause excessive dissipation or transients that could ruin the amplifier.

All components utilized in Amplifier Research instruments are conservatively operated to ensure maximum instrument reliability. Despite this, parts within an instrument may fail. In most cases, the instrument may be repaired immediately with a minimum of "down time." A systematic approach to troubleshooting can greatly simplify and thereby speed up the required repairs.

However, due to the critical importance of maintaining the amplifier's alignment, it is recommended that the unit be returned to the factory for part replacement and amplifier realignment when failure is caused by a breakdown of any of the components in the RF signal circuits. Shipping instructions are as follows.

Please ship the unit PREPAID via United Parcel Service (UPS) to:

Amplifier Research Corporation
160 School House Road
Souderton, PA 18964-9990 USA

4.2 Disassembly Procedures

⚠ **Caution:**

Extreme caution should be exercised when troubleshooting this unit, particuylarly when measuring voltages in the power supply section, since hazardous voltages exist in the unit that could cause serious injury to any personnel performing the measurements.

The amplifier can be removed from its housing by removing eight (8) screws from the front panel and four (4) screws from the back panel. The amplifier can then be slid from its housing. The bottom cover can be removed to gain access to the power supplies. The rear panel cover can be removed to gain access to the A1 Preamplifier/Leveler module, the A3 One (1)-watt Amplifier, and the A5 Four (4)-watt Amplifier. The top cover can be removed to gain access to the driver amplifier stages. The side covers can be removed to gain access to the output stages.

4.3 TROUBLESHOOTING

⚠ **CAUTION:**

THE MICROWAVE TRANSISTORS USED IN THE MODEL 120S1G3 AMPLIFIER ARE GAAS FETS. THESE DEVICES ARE VERY RELIABLE WHEN INSTALLED IN A SUITABLE CIRCUIT, BUT THEY CAN BE EASILY DAMAGED BY IMPROPER TROUBLESHOOTING OR HANDLING TECHNIQUES. THE GATE JUNCTIONS OF THE GAAS FETS HAVE A HIGH INPUT IMPEDANCE AND ARE SUSCEPTIBLE TO STATIC DAMAGE OR DAMAGE DUE TO THE USE OF AN UNGROUNDED SOLDERING IRON. DO NOT TRY TO CHECK THE FETS WITH AN OHMMETER. USE CAUTION WHEN TROUBLESHOOTING THE FETS; DO NOT SHORT THE GATE TO THE GROUND OR TO THE DRAINS.

⚠ **CAUTION:**

USE CARE WHEN UNPACKING NEW GAAS FETS; THE FET PACKAGING SHOULD ONLY BE OPENED AT ELECTROSTATIC DISCHARGE (ESD)-APPROVED WORKSTATIONS, BY INDIVIDUALS WHO ARE FAMILIAR WITHY THE HANDLING OF MICROWAVE GAAS FETS AND OTHER ESD-SENSITIVE DEVICES.

Troubleshooting the Model 120S1G3 in a logical manner can speed the solution to a problem. The settings of potentiometers ("pots"), capacitors ("caps"), or other variables should not be disturbed until other problems have been eliminated. Comparing the measured DC voltages to those shown on the schematics can solve many problems. Before measuring circuit voltages, first verify that the supply voltages to the circuits are correct.

4.3.1 Power Indicator LED Doesn't Light when the "POWER" Switch is Depressed (Schematic Diagram No. 1009611 and 1009320)

4.3.1.1 If the Model 120S1G3 is operating in an otherwise normal fashion, the power indicator LED in the switch could be defective.

4.3.1.2 Check the position of the **INHIBIT/LOCAL/REMOTE** Key Switch on the unit's front panel; it must be set to the **LOCAL** position in order to operate the front panel **POWER** switch. Check the circuit breaker on the unit's rear panel; it must be set to the "1" ("ON") position.

4.3.1.3 If the power indicator LED doesn't light, check to see that the unit is plugged into a live outlet and that the AC line cord is plugged securely into the unit.

4.3.1.4 Observe the unit's front panel vacuum fluorescent display (VFD) when the circuit breaker on the rear panel (CB1) is closed: the VFD should light up for a moment and display the amplifier's Model No. and the version no. of the software in it.

4.3.1.5 If the front panel VFD does not light up briefly as detailed in 4.3.1.4, verify that the output voltages from PS3 are correct: +15V, -15V, and +5V should all be present when CB1 is closed.

4.3.1 Power Indicator LED Doesn't Light when the "POWER" Switch is Depressed (Schematic Diagram No. 1008620) *(continued)*

4.3.1.6 If all of the correct voltages detailed in 4.3.1.5 are present at PS3 but the control panel does not respond, verify that the following voltages are present at connector A37P1 (Pin 10) of the A37 Digital Control Panel (DCP):

P1-10	+5V
P1-12	+15V
P1-14	-5V

4.3.1.7 If the correct voltages are present at P1 of the A37 Digital Control Panel but the control panel still does not respond, the A37 Digital Control Panel may require repair. Contact Amplifier Research to arrange for repair or replacement of the A37 Digital Control Panel.

4.3.2 "Power On" and "Standby" Indicator LEDs will not switch to "Operate"

4.3.2.1 If the Model 120S1G3 will not go into the "Operate" mode, verify that no faults are present. If faults are found, press the **RESET** button to see if they will clear, then press the **OPERATE** button: the **STANDBY** LED should go out and the **OPERATE** LED should light.

4.3.2.2 The DCP supplies several control signals to the amplifier. The first one occurs when the power switch is depressed. There is a +5V signal on A37J1, pin 7; this signal is used by the A40 Fault Detection Board. Its is fed to A40J2, pin 5. This signal is also fed to the A41 Regulator Board via A41J1, pin 6. The +5V signal turns on Q1 of A41, energizing Relay K1 of the A41 Regulator Board. Relay K1 turns on the +15V, -15V, +5V, and -5V power supplies, which are fed to the A40 Fault Detection Board, the A38 Level Control Board, and other circuits within the amplifier.

When the **OPERATE** button is pressed, +5V is supplied to A40J2, pin 4. If no faults are present, A40Q1 will be turned on , thereby closing Relay A40K1. A40 K1 supplies current to DC Relay K1 in the power supply, energizing K1 and applying AC to the inputs of power supplies PS1 and PS2. PS2 supplies +24VDC to the cooling fans; PS1 supplies +16.5VDC to the RF modules in the amplifier.

4.3.3 The Unit Cannot be Operated Remotely

4.3.3.1 Verify that the Keylock Switch is in the **REMOTE** position, not **LOCAL** or **INHIBIT**.

4.3.3.2 If the unit will not operate remotely, turn the Keylock Switch to the local position and check the unit for normal "Local" operation. If the unit will not operate locally, see subsections 4.3.1 and 4.3.2 of this manual.

4.3.3.3 If the unit operates normally in the "Local" mode but will not operate remotely, check the position of the Address Switch assembly on the A39 Remote Interface Board; the Address Switch assembly can be viewed through an opening in the unit's rear panel. Check to see that these switches are properly set for either RS-232 or IEEE-488 operation, as desired. (See Paragraph 2.5.5 of this manual for the proper Address Switch settings.) (NOTE: Address Switches are only read at unit power-up. Remove and re-apply AC power (reset the rear panel circuit breaker, CB1) when changing Address Switch settings.)

4.3 TROUBLESHOOTING *(CONTNUED)*

4.3.3 The Unit Cannot be Operated Remotely *(continued)*

4.3.3.4 Check to see that the DC inputs to the A39 Remote Interface Board (A39P1) are correct:

A39P1, pin 32	+12V
A39P1, pin 16	-12V
A39P1, pin 30	+5V

4.4 AMPLIFIER FAULTS

4.4.1 Safety Interlock Fault

⚠ **CAUTION:**

IF THE MODEL 120S1G3 IS CONNECTED TO A REMOTE INTERLOCK, VERIFY THAT MAINTENANCE OR SERVICE IS NOT BEING PERFORMED ON THE INTERLOCKED DEVICE BEFORE APPLYING RF ENERGY TO THAT DEVICE.

4.4.1.1 The remote interlock requires a connection between Pins 1 and 8 of the Model 120S1G3's rear panel Interlock Connector (P17).

4.4.1.2 When the remote interlock is not in use, a "dummy" plug with a connection between pin 1 and pin 8 must be installed in the rear panel interlock connector.

4.4.1.3 Check the voltage on pins 1 and 8 of P17; it should be approximately 4.5VDC. If 4.5VDC is not present on pins 1 and 8, remove the mating Interlock Connector from the rear panel and check the voltage on pin 1 of P17; it should be approximately 5VDC.

4.4.1.4 If 5VDC is present on pin 1of P17 when the mating connector is removed, but it is not present when the mating connector is installed, there may be a short to ground on the amplifier's external Interlock Circuit.

4.4.2 +24V Fault

4.4.2.1 Check for +24V output from Power Supply PS2 on connector J2, pin 1. If there is no output voltage on J2, pin 1, check the AC input on J1, pin 1.

4.4.2.2 If AC is present on the input of PS2 but there is no output, remove plug P10 from the output connector of PS2. If the voltage output is not correct, there may be short on the output of PS2.

4.4.2.3 If the output voltage of PS2 is correct with the output connected and the unit's cooling fans are running, there may be an open connection to the 24V input of the Fault Detection Board or a problem in the Fault Detection Board.

4.4 AMPLIFIER FAULTS *(CONTINUED)*

4.4.3 -5V Fault

4.4.3.1 Check for -5VDC output from the A41 Regulator Board on connector J2, pin 1, 2, or 3.

4.4.3.2 If -5VDC is present on the output of the A41 Regulator Board but is not present at the input to the A40 Fault Detection Board, check the wiring between the boards.

4.4.3.3 If -5VDC is not present on the output of A41, J2, check the -15V input to the A41U2 -5V regulator.

4.4.3.4 If -15V is not present on the input of U2, check the A41K1 relay for proper operation and the -15V output from Power Supply PS3.

4.4.4 +16.5V Fault

4.4.4.1 Check the output voltage from Power Supply PS1. If 16.5V is present, check the DC voltage on A40J2, pin 18 of the Fault Detection circuit; it should be approximately 5VDC. If the voltage on A40J2, pin 18 is correct, troubleshoot the +16.5V fault detection circuits on the A40 Fault Detection Board.

4.4.4.2 If the voltage on A40J2, pin 18 is low (<2.5V), remove the AC input to the amplifier and unplug connector P11 from J1 in the output module of Power Supply PS1.

4.4.4.3 With P11 removed, reconnect the AC input to the amplifier. If the fault is cleared, the fault output circuit of PS1 may be defective. If the fault does not clear, there may be a short to ground in the fault line between PS1 and the A40 Fault Detection Board or a problem with the A40 16.5V fault detection circuitry.

4.4.5 Forward/Reverse (FWD/REV) Power Fault

4.4.5.1 If the Model 120S1G3 registers a **FWD/REV** Power fault, lowering the RF input drive level may correct the problem. The amplifier will attenuate the RF input signal if the maximum forward or reverse power levels are exceeded; if the attenuator cannot sufficiently reduce the amplifier's RF power output, the DC voltage will be removed from the A3 One (1)-watt Amplifier in the Model 120S1G3's Low-Level Driver stage.

4.4.5.2 If a Forward or Reverse Power fault occurs without an RF input, check for the presence of an RF signal on the amplifier's output; this could be caused by an oscillation in a low-level or driver stage.

4.4.5.3 The Forward and Reverse Power fault signal is generated in the A38 Level Control Board; the output voltage on A38P1, pin 18 is normally high (approximately 15V). The output on A38P1, pin 18 goes low (<2.5V) when a Forward or Reverse Power fault occurs.

4.4.5.4 The Forward/Reverse Power fault signal is fed to the A40 Fault Detection Board via A40J1, pin 17.

4.4 AMPLIFIER FAULTS *(CONTINUED)*

4.4.6 Thermal Faults

4.4.6.1 If the Model 120S1G3 registers a Thermal fault, check to see that the air inlet on the bottom of the amplifier and the air outlet on the rear panel of the amplifier are not obstructed.

4.4.6.2 The amplifier can be reset and returned to the "Operate" mode once the heat sinks have cooled to <70°C.

4.4.6.3 Check to see that the air output from the amplifier's three rear panel air outlets is even; if less warm air is blowing out of one of the outlets than out of the other two outlets, one of the amplifier's cooling fans may be defective. The air flow from the rear panel outlet should be >500 feet per minute (fpm).

4.4.7 Fuse/Amplifier Faults

4.4.7.1 The Model 120S1G3's VFD will display a fuse/amplifier (**FUSE/AMP**) fault if a fuse opens, if there is an open DC line to an amplifier module, or if there is an Amplifier fault.

4.4.7.2 If the Model 120S1G3 registers a **FUSE/AMP** fault, check the following fuses before opening up the amplifier's cabinet:

- Fuse/Amp Fault Top—check Fuses F1 and F2
- Fuse/Amp Fault Right—check Fuses F3 and F4
- Fuse/Amp Fault Left—check Fuses F5 and F6

4.4.7.3 If the fuses are O.K., remove the amplifier from its case and remove the cover from the appropriate surface of the amplifier to gain access to the amplifier modules.

4.4.7.4 The amplifier module or modules having a fault should have an LED illuminated at the Output end of the module. The LED can be viewed through the small perforated opening in the module's cover.

4.4.7.5 Before removing the cover from the amplifier module, verify that -5V and +16.5V are present on the DC inputs to the modules. The drain voltage of the GaAs FETs can also be monitored on test points TP1 and TP2 of the amplifier module; the voltage on TP1 and TP2 is typically 10.4V without RF drive.

4.4.8 Fault Detection Board/Digital Control Panel (DCP) Interface

4.4.8.1 **Table 4-1** lists the fault, the input pins to the Fault Detection Board, and the output and input pins to the DCP, as well as the state (1 or 0) of each pin during a fault condition.

4.4.8.2 U7 on the Fault Detection Board is a priority encoder that encodes eight (8) input lines to four (4) output lines.

4.4 AMPLIFIER FAULTS *(CONTINUED)*

4.4.8 Fault Detection Board/Digital Control Panel (DCP) Interface *(continued)*

Table 4-1
Model 120S1G3 Digital Control Panel (DCP) Fault Inputs

Model 120S1G3 Fault/ A40 Fault Detection Board Input Pin							
None	1	1	1	1	1	1	1
Safety Interlock Fault A40J1-13	0	1	1	0	1	1	1
+24V Fault A40J1-9	0	0	0	1	1	1	1
-5V Fault A40J1-8	1	0	0	1	1	1	1
FWD/REV Power Fault A40J1-17	0	1	0	1	1	1	1
Thermal-Left Fault A40J1-16	1	1	0	1	1	1	1
Thermal-Right Fault A40J1-15	0	0	1	1	1	1	1
Thermal-Top Fault A40J1-16	1	0	1	1	1	1	1
+16.5V Fault A40J2-18	0	1	1	1	1	1	1
Amplifier-Top Fault A40J1-11	1	1	1	1	0	1	1
Amplifier-Right Fault A40J1-4	1	1	1	1	1	0	1
Amplifier-Left Fault A40J1-6	1	1	1	1	1	1	0
A40 Fault Detection Board Output	J2-9	J2-8	J2-7	J2-6	J2-14	J2-15	J2-17
A37 DCP Input	P1-16	P1-17	P1-18	P1-19	P1-20	P1-21	P1-22

4.5 LOW OR NO RF OUTPUT

All indicators on the Model 120S1G3 are normal and the unit's cooling fans are in operation.

4.5.1 Front Panel Checks

4.5.1.1 Check the Model 120S1G3's RF Gain setting: is it set at maximum (100%)? Monitor the RF Output power on the unit's VFD: does the VFD indicate a high Forward power level with a high Reflected power level as well? If so, the connection to the Model 120S1G3's RF Output may be defective, or the load being used may be defective.

4.5 LOW OR NO RF OUTPUT *(CONTINUED)*

4.5.1 Front Panel Checks *(continued)*

4.5.1.2 Is the Model 120S1G3 set to the correct mode of operation (Manual, ALC, or Pulse)?

4.5.1.3 If the Model 120S1G3 is operating in the "Pulse" mode, a pulsed input (in addition to an RF input signal) is required to generate an RF output signal.

4.5.1.4 If the Model 120S1G3 is operating in the ALC mode, is the ALC Threshold set to 0%, or is the ALC Gain set to "high"?

4.5.1.5 Is the RF input to the Model 120S1G3 the correct frequency and amplitude?

4.5.2 Low or No RF Output (DC Tests)

4.5.2.1 Check the DC input voltages to the Model 120S1G3's A1 Preamplifier/Leveler module; these voltages should be as follows:

A1C10	≥12V
A1C14	-15V ± 0.4V
A1C15	+15V ± 0.4V

4.5.2.2 Check the DC voltages supplied to the A4 Bias Control Board; these voltages should be as follows:

A4, Pin 3	+16.5V ± 0.5V
A4, Pin 1	-5V ± 0.4V

4.5.2.3 Check the DC voltages on the feed-through capacitors of the A3 One (1)-watt Amplifier; these voltages should be as follows:

A3C3, A3C5, A3C7	0.7 to -3.5V
A3C4	7.6 ± 0.5V
A3C6	10.2 ± 0.5V
A3C8	10.2 ± 0.5V

4.5.2.4 Check the DC voltages on the feed-through capacitors of the A5 Four (4)-watt Amplifier; these voltages should be as follows:

A5C1	16.5V ± 0.5V
A5C4	-5V ± 0.4V
A5C11 (TP1)	10.4V ±0.4V

4.5 LOW OR NO RF OUTPUT *(CONTINUED)*

4.5.2 Low or No RF Output (DC Tests) *(continued)*

4.5.2.5 Check the DC voltages on the feed-through capacitors of the A7, A8, A11, A12, A13, A14, and A19–A34 Quadrature-Coupled Amplifiers; these voltages should be as follows:

C1	16.5V ± 0.5V
C4	-5V ± 0.4V
TP1	10.4V ±0.4V
TP2	10.4V ±0.4V

4.5.3 Low or No RF Output (RF Tests)

NOTE: The DC Tests specified in Paragraphs **4.5.2.1–4.5.2.5** should be completed before conducting the RF tests specified in the following paragraphs.

NOTE: Phase matching must be maintained from the output of the A6 Two-Way Splitter to the input of the A35 16-Way Combiner.; coaxial cables that are removed must be reinstalled in the same location from which they were removed. Replacement coaxial cable assemblies must be the same lengths as the original ones.

4.5.3.1 The Model 120S1G3's typical Gain Response is shown in **Figure 4.5.3.1.** The actual gain may vary considerably from that shown in Figure 4.5.3.1, but it should be **≥51dB**.

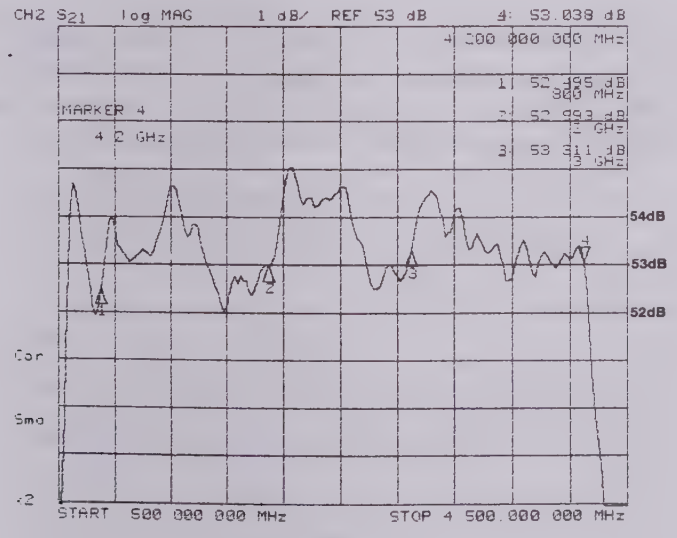


Figure 4.5.3.1
Typical Response Amplifier Gain and Flatness

NOTE: If the overall gain is low, the amplifier chain can be separated at the input to the A6 Two-Way Splitter and the gain can be checked from the input to the A6 Two-Way Splitter to the **RF OUTPUT** connector on the unit's front panel.

4.5.3 Low or No RF Output (RF Tests) *(continued)*

4.5.3.2 Remove the coaxial cable from the output of the A5 Four (4)-watt Amplifier to the input of the A6 Two-Way Splitter. The typical response from the input of the A6 Two-Way Splitter to the **RF OUTPUT** connector on the unit's front panel is shown in **Figure 4.5.3.2**.

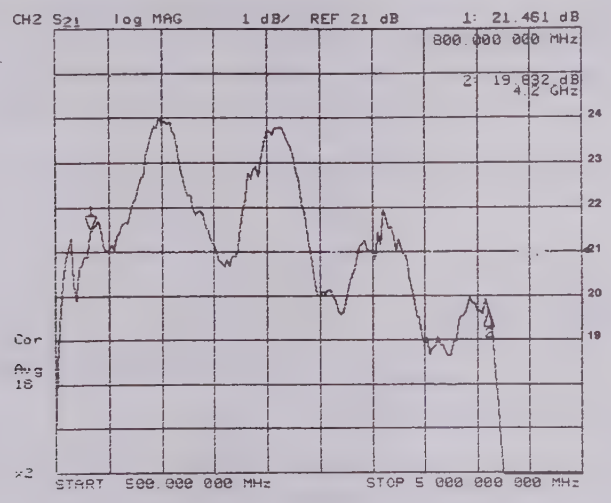


Figure 4.5.3.2
Typical Response: Input A6–Front Panel RF Output

If the response is normal, see Paragraph **4.5.3.8**. If the response is abnormal, perform the following tests.

4.5.3.3 If the gain is slightly low (i.e., several dB below typical), try disconnecting the inputs from the A19–A34 Quad Amps one at a time, then reconnect them. Note the difference in response when disconnecting the Quad Amps; if any Quad Amp causes less of a change in gain than the others, check the Quad Amp and the coaxial cable associated with that Quad Amp. Typical Quad Amp Response is shown in **Figure 4.5.3.3**.

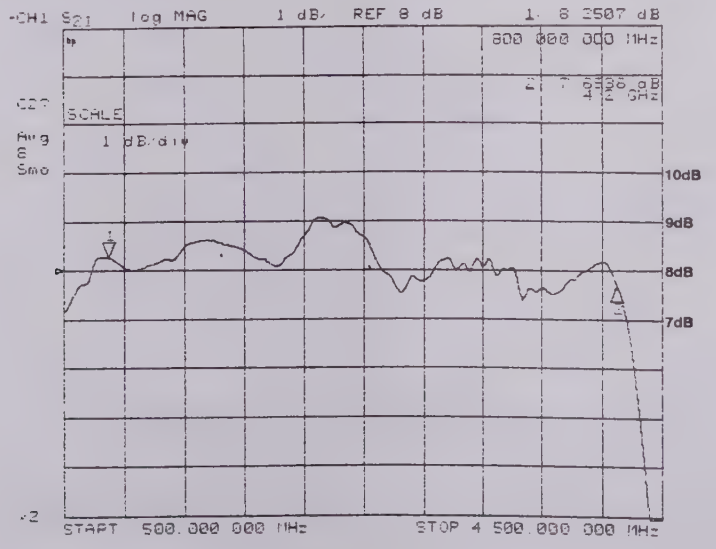


Figure 4.5.3.3
Typical Quad Amp Response

4.5.3 Low or No RF Output (RF Tests) *(continued)*

4.5.3.4 If the gain is 5dB or more below the typical response, do the following:

- Disconnect the coaxial cable from the input of the A7 Quad Amp, and note the results.
- Reconnect the coaxial cable from the input of the A7 Quad Amp and disconnect the coaxial cable from the input of the A8 Quad Amp; the results should be similar. If not, check the side that made the least difference. Check the Two-Way Splitter, the Four-Way Splitter, the Quad Amp, and so forth.

4.5.3.5 A typical Two-Way Splitter Insertion Loss is shown in **Figure 4.5.3.5**. The unused port must be terminated when checking the insertion loss.

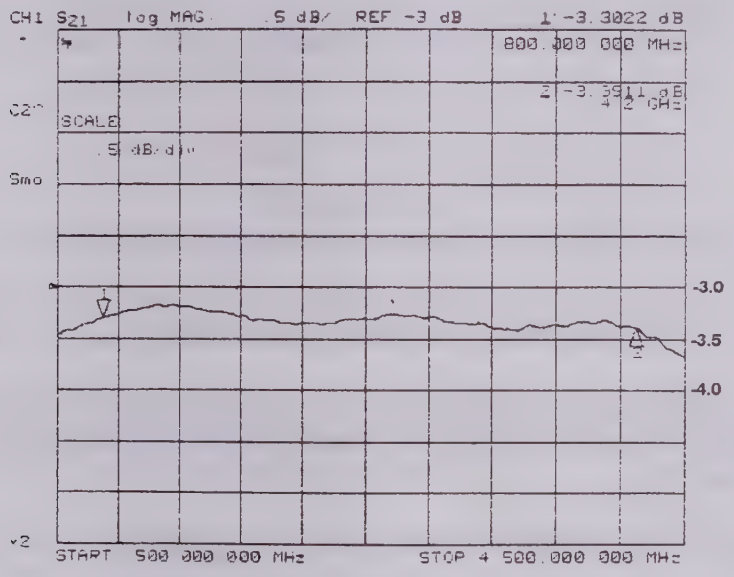


Figure 4.5.3.5
Typical Two-Way Splitter Insertion Loss

4.5.3 Low or No RF Output (RF Tests) *(continued)*

4.5.3.6 A typical Four-Way Splitter Insertion Loss is shown in **Figure 4.5.3.6**. The unused ports must be terminated when checking the insertion loss.

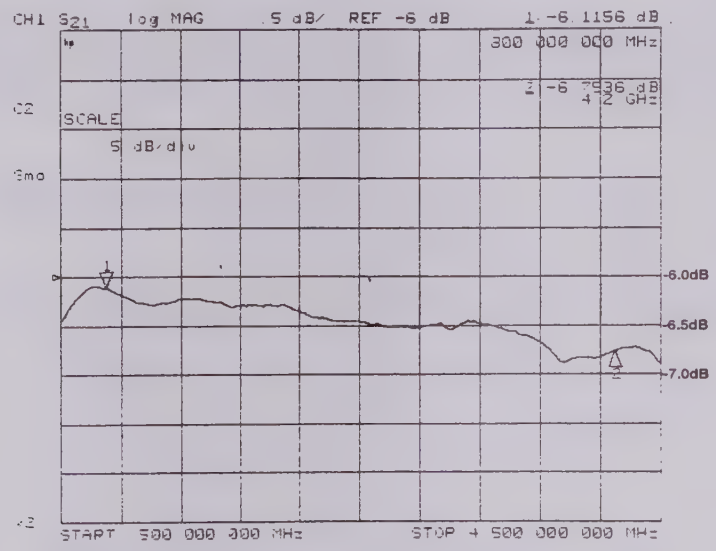


Figure 4.5.3.6
Typical Four-Way Splitter Insertion Loss

4.5.3.7 A typical 16-Way Combiner Insertion Loss and Combined Port Return Loss is shown in **Figures 4.5.3.7** and **4.5.3.7a**. The unused ports must be terminated when checking the Insertion Loss.

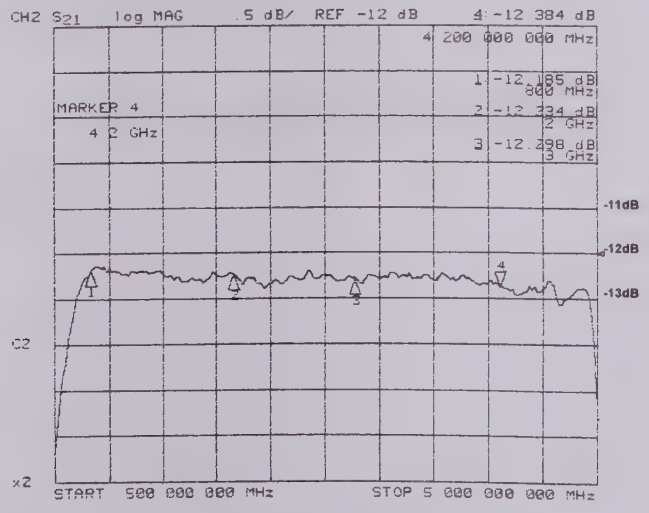


Figure 4.5.3.7
Typical 16-Way Combiner Insertion Loss

4.5.3 Low or No RF Output (RF Tests) *(continued)*

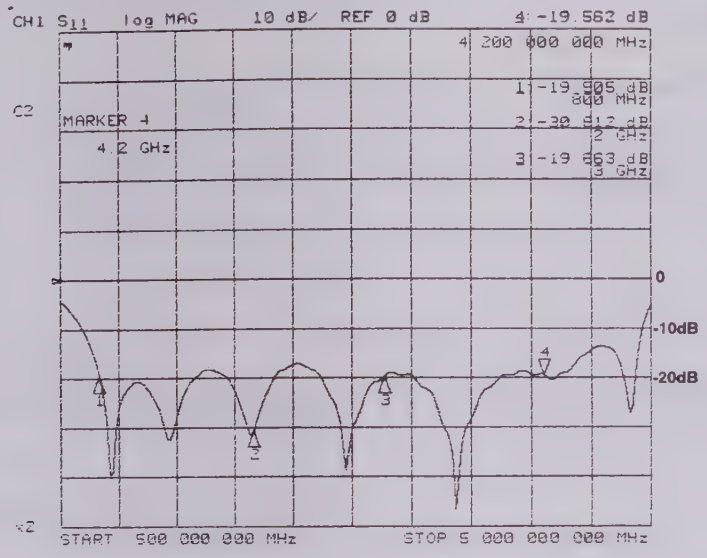


Figure 4.5.3.7a
Typical 16-Way Combiner Return Loss: Combined Output Port

NOTE: The Return Loss of the 16-Way Combiner's combined output port is typically better than **17dB** (see **Figure 4.5.3.7**).

NOTE: The A3 One (1)-watt Amplifier's response or the A1 Variable Gain Amplifier's response may differ considerably—particularly in flatness—from the typical responses shown in the following Figures (4.5.3.8 and 4.5.3.9).

4.5.3.8 The typical response for the A4 One (1)-watt Amplifier is shown in **Figure 4.5.3.8**.

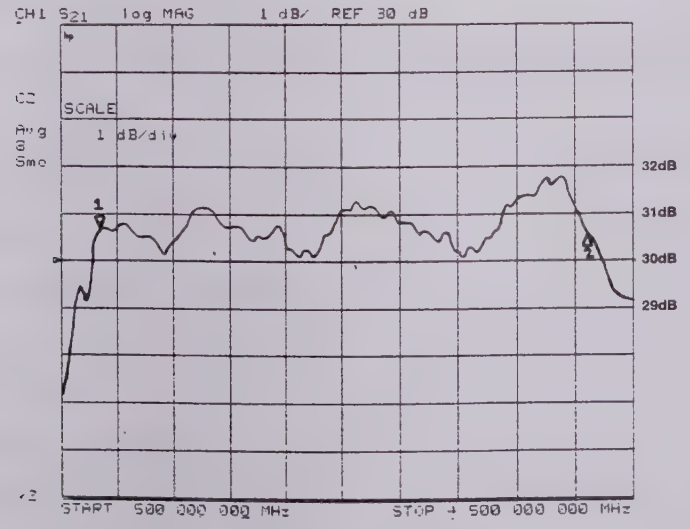


Figure 4.5.3.8
Typical A3 One (1)-watt Amplifier Response

4.5.3 Low or No RF Output (RF Tests) *(continued)*

4.5.3.9 The typical response for the A1 Preamplifier/Leveler (at maximum gain setting) is shown in **Figure 4.5.3.9**.

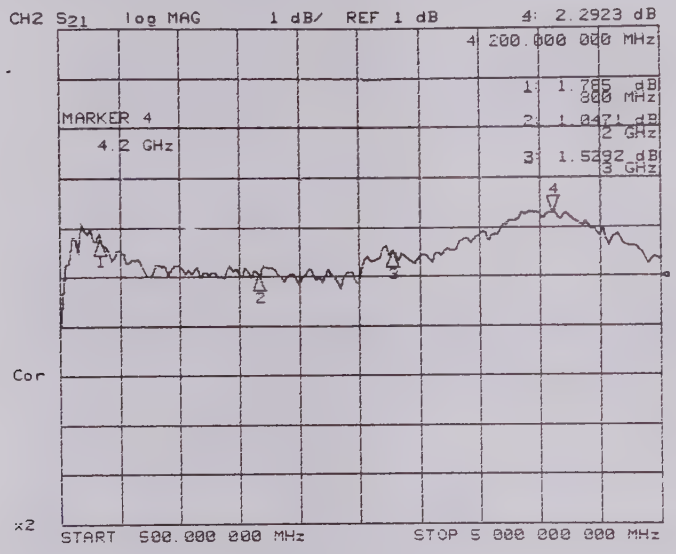


Figure 4.5.3.9
Typical A1 Preamplifier/Leveler Response

SECTION V

REPLACEABLE PARTS

5.1 INTRODUCTION

This section contains information for ordering replacement parts. Information is provided for obtaining parts through Amplifier Research and/or from the manufacturer of the part. Included in this section are the following:

- Ordering Information
- Non-Listed Parts
- Circuit Designators
- Manufacturers' Abbreviation Listing
- Master List
- Schematics and Bills of Material (BOMs)

5.2 ORDERING INFORMATION

To obtain replacement parts, address your order to Amplifier Research, 160 School House Road, Souderton, PA 18964-9990 USA. Please include the instrument's Model Number and Serial Number.

TEL: 215 723-8181

TWX: 510 661-6094

FAX: 215 723-5688

5.3 NON-LISTED PARTS

To obtain a part that is not listed in this section, please include the following information with your order:

a. Instrument Model Number

b. Instrument Serial Number

c. Description of the Part

d. Function and Location of the Part

5.4 CIRCUIT DESIGNATORS

REF = Reference Document

A = Assembly

B = Fan

BT = Battery

C = Capacitor

5.4 CIRCUIT DESIGNATORS *(CONTINUED)*

CB = Circuit Breaker

CR = Diode

DL = Delay Line

DS = Lamp

E = Terminal

F = Fuse

F = Filter

J = Connector, Recept.

K = Relay

L = Inductor

M = Meter

P = Connector, Plug

Q = Transistor, Semiconductor

R = Resistor, Potentiometer

RT = Temperature-Sensing Element

S = Switch

T = Transformer

TB = Terminal Block

TP = Test Point

U = Integrated Circuit

V = Vacuum Tube, Neon Bulb, Photocell, etc.

VR = Zener Diode

W = Wire, Cable

X = Socket

Y = Crystal Unit

5.5 MANUFACTURERS' ABBREVIATION LISTING

This section contains a list of manufacturers' abbreviations. These abbreviations appear under the "Drawing Number" column on the Bills of Material (BOMs). The three letters or symbols before the backward slash represent the name of the manufacturer. The number after the backward slash represents the manufacturer's part number. See **Appendix A** (at the end of this section) for a complete listing of manufacturers' abbreviations.

5.6 MASTER LIST

The Master List provides the user with a quick view of the major assemblies of a unit. The assemblies are displayed in an indented format, with the corresponding schematic shown in the right column.

5.7 SCHEMATICS AND BILLS OF MATERIAL (BOMS)

The schematics and BOMs are arranged in sequence according to the Master List. The schematic that appears first on the Master List also appears first in the schematic and BOM section. Following each schematic are the appropriate BOMs relating to the schematic. This pattern is repeated throughout this section.

The BOMs used in this manual are computer-generated. Each computer part number appears only once on a BOM, along with the total quantity used and all of the applicable circuit designators. The BOMs are designed to organize the parts in alphanumeric order of their circuit designators. Typical manufacturer part numbers can be found in the drawing number column. The manufacturer's abbreviation appears first, separated by a backward slash, which is followed by the part number.

Amplifier Research has assigned computer product numbers to all parts in inventory. The computer product numbers are located on the left side of the BOM in the "Part Number" field. When referencing or ordering parts from Amplifier Research, it is best to use the computer product number. Parts may also be ordered directly from the manufacturer by using the manufacturer's part number, if desired.

AAV ..... AAVID
ABB ..... ABBEON
ACA ..... ANTENNA CORPORATION OF AMERICA
ACO ..... ARCO
ADA ..... ADALET
AND ..... ASTRO DYNE
AEC ..... ARNOLD ENGINEERING COMPANY
AEP ..... APPLIED ENGINEERING PRODUCTS
AER ..... AEROQUIP
AEX ..... AEROVOX
AHC ..... AIRLINE HYDRAULICS CORPORATION
AIN ..... AIN PLASTICS
AIR ..... AIRPAX
AIT ..... AERITALIA
AJO ..... A. J. OSTER FOILS INCORPORATED
ALC ..... ALCO
ALE ..... ALLIED ELECTRONICS
ALI ..... ASTROLAB INCORPORATED
ALP ..... ALPHA
AMA ..... AMATOM
AMC ..... AMPEX CORPORATION
AMH ..... AMPHENOL
AMI ..... AMPLIFONIX INCORPORATED
AMP ..... AMP INCORPORATED
AMR ..... AMREP
AMS ..... AMERICAN STANDARD
AND ..... ANALOG DEVICES
ANZ ..... ANZAC
APG ..... AP-O-GEE INDUSTRUES
APN ..... AMERICAN PRECISION
APO ..... AMPROBE
APP ..... A. P. PRODUCTS INCORPORATED
APR ..... AMPERITE
APX ..... AMPEREX
ARC ..... AMPLIFIER RESEARCH CORPORATION
ARE ..... ARROW ELECTRONICS
ARO ..... AROMAT CORPORATION
ARP ..... APPLE RUBBER PRODUCYS INCORPORATED
ASB ..... ASTRO-BUBBLES
ASC ..... AMERICAN SWITCH CORPORATION
ASD ..... AMERICAN STANDARD
ASP ..... ASSOCIATED SPRING
AST ..... ASTEC
ATC ..... AMERICAN TECHNICAL CERAMICS CORPORATION
ATL ..... ATLEE
AUG ..... AUGAT INTERCONN COMP DIVISION
AVA ..... AVA CORPORATION
AVF ..... ALLENTOWN VALVE & FITTING COMPANY
AVT ..... AVANTEK
AVX ..... AVX CORPORATION
A-B ..... ALLEN BRADLEY
A-C ..... ANDREW CORPORATION
A-M ..... AEC MAGNETICS
A-S ..... ALCOSWITCH

A-T	AHAM-TOR
BBI	BARON-BLAKSLEE INCORPORATED
BDX	BENDIX
BEG	BERG CORP
BEL	BELDEN
BER	BERKLEY & COMPANY
BEY	BEY ELECTRIC
BFG	B.F. GOODRICH
BFI	BUCKEYE FORGE INCORPORATED
BKM	BECKMAN
BLL	BELLING LEE
BOK	BOKER'S INCORPORATED
BOP	BOPLA ENCLOSURES
BOR	BOURNS
BRD	BIRD ELECTRONICS
BRG	BERGQUIST
BUD	BUD COMPANY
BUL	BULGIN
BUS	BUSS
B-C	BONCO CORPORATION
B-E	BRIM ELECTRONICS
B-T	BEAU-TECH
B-V	BEAU/VERNITRON
CAD	CADDOCK
CAM	CAMBION
CAN	CANNON
CAP	CANPACK
CAR	CARLING
CAT	CATAMOUNT
CCI	CRL COMPONENTS INCORPORATED
CDC	COMPACT DEVELOPMENT CORPORATION
CDI	COAXIAL DYNAMICS INCORPORATED
CEN	CENTURY ELECTRONICS
CES	COUNTY ELECTRIC SUPPLY COMPANY
CGI	COMPONENT GENERAL INCORPORATED
CHE	CHERRY
CHO	CHOMERICS
CHR	CONNETICUT HARD RUBBER
CIN	CINCH
CJS	CENTRAL JERSEY SCREW & BOLT
CKS	C & K COMPONENTS INCORPORATED
CLA	CLAROSTAT
CLC	CHICAGO LOCK COMPANY
CMI	CERAMIC MAGNETICS INCORPORATED
CMP	COMMERCIAL PLASTICS
CMT	CONTINENTAL MICROWAVE & TOOL
CNF	CINCINNATI FAN
COE	COMP ENTERPRISES
COL	COLDER PRODUCTS
COM	COMPUCON
CON	CONCORD ELECTRONICS
COP	COMPLETE PACKAGING
COR	CORCOM
CPC	C.P. CLARE

CPI.....COMPUTER PRODUCTS INC.
CPL.....COMPULITE
CPS.....COLOR PRINT SCREENING
CRC.....CRC CHEMICALS
CTS.....CTS OF BERNE INCORPORATED
CUS.....CUSTOM
C-D.....CORNELL-DUBILIER
C-E.....CORNING ELECTRONIC
C-I.....CRAFTECH INDUSTRIES
C-P.....CAPLUG COMPANY
C-T.....CANADIAN THERMOSTATS
CWD.....CESIWID INCORPORATED
DAL.....DALE
DAT.....DATEL INC
DEL.....DELKER
DAY.....DAYTON
DEN.....DENNISON
DIA.....DIALIGHT
DII.....DATONA INDUSTIRES INCORPORATED
DIL.....DIELECTRIC LABS
DKK.....DOW KEY/KILOVAC
DLS.....DALLAS SEMICONDUCTOR
DLT.....DELTRON
DSC.....DE-STA-CO
DTP.....DOYLESTOWN PRINTING
DUP.....DU PONT ELECTRONICS
DYN.....DYNATECH
D-E.....DARBURN ELECTRONICS
D-G.....DIMCO-GRAY
D-K.....DIGI-KEY-CORPORATION
EBM.....EBM IND.
ECO.....EATON CORPORATION
ECS.....ECS INTERNATIONAL
EFJ.....E.F.JOHNSON
EGG.....EG & G OPTOELECTRONICS
EGL.....ELGAL
EIC.....ELCTRO INSULATION CORPORATION
EII.....EDAL INDUSTRIES INC.
EIM.....EIMAC
ELC.....ELECTRO SWITCH CORPORATION
ELM.....ELMENCO
ELR.....ENGLER INSTRUMENT
EMC.....E.M.C. TECHNOLOGY
EMI.....ELECTRONIC MEASUREMENTS,INC.
EMM.....ENGLEMANN MICROWAVE
EOD.....ELECTRO-OPTIC DEV
ERI.....ERIE TECHNOLOGY PRODUCTS
ERM.....EREM CORPORATION
ESX.....ESSEX
ETA.....ETA
EVE.....EVEREST ELECTRONIC EQUIPMENT
EVR.....EVEREADY
EWS.....ELMWOOD SENSOR
E-C.....EMERSON AND CUMMING

EZF ..... EZ FORM CABLE CORPORATION
FAR ..... FARNELL COMPONENTS
FCH ..... FAIRCHILD
FCI ..... FILTER CONCEPTS INCORPORATED
FER ..... FERRONICS
FEX ..... FERROXCUBE
FLO ..... FLO TRAN PNEU-DRAULICS INCORPORATED
FLP ..... FLURO PLASTICS
FOS ..... FIBRE OPTIC COMMUNICATION SPECIALTIES
FRA ..... FRANZUS
FRK ..... FROST KING
FRM ..... FREEDMAN/MALTA
FRP ..... FAIR-RITE PRODUCTS
FUJ ..... FUJITSU
FWC ..... FW CAPACITORS
F-S ..... FASTENER SPECIALTY
GAL ..... GALLAGER
GCE ..... G.C. ELECTRONICS
GCS ..... GLOBAL COMPUTER SALES
GEM ..... GEM
GDC ..... GENERAL DEVICES CO.
GOL ..... GOLDKAMP
GRA ..... GRAINGER
GRE ..... GREYARC
GRS ..... GENERAL RADIO SUPPLY
GRY ..... GRAYHILL CORP
GSI ..... GSI
GTL ..... GILWAY TECHNICAL LAMP
G-E ..... GENERAL ELECTRIC COMPANY
G-I ..... GENERAL INSTRUMENT
GUD ..... GUDEN
HAD ..... HARRY DAVIES
HAN ..... HANSON
HAR ..... HARRIS CORP
HAV ..... HAVERHILL CABLE AND MANUFACTURING
HDB ..... HOMER D. BRONSON
HEC ..... HIGH ENERGY CORPORATION
HEI ..... HEINEMANN
HEY ..... HEYCO MOLDED PRODUCTS
HEX ..... HEXACON
HHS ..... H.H. SMITH
HII ..... HOLODAY INDUSTRIES INCORPORATED
HIM ..... HITACHI MAGNETS
HMF ..... HILTON MANUFACTURING
HMN ..... HENRY MANN
HOF ..... HOFFMAN PRODUCTS
HOL ..... HOLLINGSWORTH
HOW ..... HONEYWELL
HPC ..... H.P.CADWALLADER
HSI ..... HUBER & SUHNER INCORPORATED
HUB ..... HUBBEL
HUC ..... HUDSON CAN COMPANY
HUV ..... HANDLES UNLIMITED VERMALINE DIV.
HWK ..... HAWKINS METAL FABRICATION

H-C ..... HARTWELL CORP. COMMERCIAL DIVISION
H-P ..... HEWLETT/PACKARD
H-R ..... HERBACH & RADEMAN
IBM ..... IBM
ICI ..... ILLINOIS CAPACITOR INCORPORATED
IDE ..... IDEAL
IER ..... IERC
ILS ..... ILSCO
IMB ..... IMB
IMC ..... IMC
IML ..... IMLEC
INC ..... INTERNATIONAL CRYSTAL MFG COMPANY
INM ..... INMET
INT ..... INTERMATIC INC
IPI ..... INSULFAB PLASTICS INCORPORATED
IRC ..... INTERNATIONAL RESISTIVE COMAPNY, INC.
IRM ..... IR-CRYDOM
ITF ..... ITERFAN
ITJ ..... ITT-JENNINGS
ITT ..... ITT CANNON
I-E ..... IMPERIAL EASTMAN
I-G ..... INDIANA GENERAL
I-R ..... INTERNATIONAL RECTIFIER CORPORATION
I-S ..... INSTRUMENT SPECIALTIES
JAR ..... J.A. REINHARDT
JDE ..... JOHANSON DIELECTRICS
JER ..... JERGENS INCORPORATED
JFD ..... JFD
JOH ..... JOHANSON
JON ..... JONATHAN MANUFACTURING
JOR ..... JORITA
JSR ..... JAY-CEE SALES & RIVET INC.
KCC ..... KEYSTONE CARBON COMPANY
KEY ..... KEYSTONE ELECTRONICS
KIN ..... KINGS
KLE ..... KLEIN
KSD ..... KESTER SOLDER DIVISION
KUL ..... KULKA
K-D ..... KD COMPONENTS
LAF ..... LAFRANCE CORPRATION
LBA ..... LAMBDA ELECTRONICS INCORPORATED
LEM ..... LIAISONS ELECTRONIQUES MECHANIQUES
LEV ..... LEVITON MANUFACTURING COMPANY
LIF ..... LITTLEFUSE
LOC ..... LOCTITE CORPORATION
LOR ..... LORD CORPORATION
LTC ..... LINEAR TECHNOLOGY COPR
MAC ..... MACOM
MAL ..... MALLORY
MAR ..... MARKEL CORPORATION
M-C ..... MICROCHIP
MCG ..... McGILL
MCR ..... MICREL INCORPORATED
MCS ..... McMASTER CARR SUPPLY COMPANY

MCX..... MICRO-COAX
MDC..... MICROWAVE DEVELOPMENT CO.
MDP.....MODPAK
MEA..... MITSUBISHI ELECTRONICS AMERICA, INC.
MEP .....MEPCO-ELECTRA
MET ..... METUCHEN CAPACITOR
MFG ..... MANUFACTURER
MHW .....M.H. & W. COMPANY
MIC .....MICROMETALS IRON POWDER CORES
MIN..... MINI-CIRCUITS
MIP .....MICRO PLASTICS
MIR..... MINOR RUBBER COMPANY
MIS .....MICROSWITCH
MIT ..... MULTITHERM CORPORATION
M-K..... MK
MLC ..... M. LADER COMPANY
MLX..... MILL-MAX CORP
MMI .....MAGNETIC METALS INCORPORATED
MMM .....MINNESOTA MINING MANUFACTURING
MOC.....MOCAP
MOD ..... MODUTEC
MOL.....MOLEX
MOR.....MORS COMPONENTS INC
MON ..... MONSANTO
MOS .....M/A-COM OMNI SPECTRA INCORPORATED
MOT..... MOTOROLA
MPC ..... MULTI-PRODUCTS
MRS.....MARSH
MSC ..... MICROSEMI CORPORATION
MUE..... MUELLER
MUR.....MURATA/ERIE
MWA ..... MICROWAVE ASSOC
MWC.....MIDWEST COMPONENTS
MWM.....MIDWEST MICROWAVE
MWS ..... MICROWAVE SEMI-CONDUCTORS
M-C ..... M & C SPECIALTIES
M-E .....MASTER ELECTRICIAN
M-M .....MULTI-MAX CORPORATION
NAB ..... NORTH AMERICAN BRASS AND COPPER
NEB..... NEBS INCORPORATED
NET.....NETEK
NEW.....NEWAGE INDUSTRIES
NIA ..... NIAGRA PLASTICS
NIC..... NIC COMPONENTS
NIE..... NIELSEN HARDWARE
NJS.....N.J. SEMI
NKK..... NKK SWITCHES
NMB..... NMB TECHNOLOGIES INCORPORATED
NOB ..... NOBLITT BROTHERS & COMPANY
NOR .....NORITAKE
NPP .....NORTH PENN POLISHING & PLATING
NSI .....NATIONAL SEMI-CONDUCTOR CORPORATION
NVS..... NORTHAMPTON VALLEY SERVICE COMPANY
N-I.....NATIONAL INSTRUMENTS

N-M ..... NATIONAL MOLDITE
N-P ..... NEM-PACK
OAP ..... OLEAN ADVANCED PRODUCTS
OHA ..... OHIO ART
OHN ..... OHMLITE
OKI ..... OK INDUSTRIES
OME ..... OMEGA
OMR ..... OMRON
OPM ..... OPTIMA
OPT ..... OPTIMAX
PAE ..... PACIFIC ELECTRICORD
PAJ ..... PHILLIPS AND JACOBS
PAM ..... PAMOTOR
PAN ..... PANASONIC
PAP ..... PAPST
PBC ..... POTTER & BRUMFIELD CORPORATION
PCI ..... PENN CRAFT INDUSTRIES
PEC ..... PENN CONTROLS
PCC ..... PANEL COMPONENTS CORPORATION
PEK ..... PEAK
PEN ..... PENN ENGINEERING
PFL ..... POLYFLON
PFS ..... POWER FILM SYSTEMS
PHC ..... PARKER HANNIFIN CORPORATION
PHI ..... POWER HYBRID
PLM ..... PLASTIC & METALS
PMP ..... PRECISION METAL PROD.
PMI ..... PRECISION MONOLITHICS INC.
PNT ..... PANDUIT
P-O ..... POWER ONE
POW ..... POWEREX
PRC ..... PRECISION RUBER COMPANY
PSI ..... POWER SEMI-CONDUCTOR INCORPORATED
PSP ..... PROJECT SUPPORT INCORPORATED
PTC ..... PRECISION TUBE COMPANY
P-B ..... PENN-BASCO
QUI ..... QUICKSET
RAA ..... RADIALL
RAF ..... R.A.F. ELECTRONIC HARDWARE INCORPORATED
RCA ..... RCA
RCC ..... RAYCHEM CORPORATION
RCL ..... RCL
REL ..... RELIANCE MICA COMPANY
REM ..... REMTEK
RES ..... ROSE ENCLOSURES SYSTEMS
RFP ..... RF POWER COMPONENRS INC
RIC ..... RICHCO
ROG ..... ROGAN
RON ..... RONCO CORPORATION
ROS ..... ROSS ENGINEERING
ROT ..... ROTRON
ROW ..... ROWLAND
RPC ..... REPUBLIC PACKAGING CORPORATION
RUS ..... RUSSEL INDUSTRIES

R-H ..... RYAN HERCO
R-N ..... ROBINSON-NUGENT
R-S ..... RADIO SHACK
SAG ..... SAGE LABORATORIES
SAM ..... SAMTECH
SBC ..... SCHROEDER BROTHERS CORPORATION
SCD ..... SCHADOW
SCH ..... SCHAUER
SCI ..... SPECTRUM CONTROL INCORPORATED
SCO ..... SCOTCH
SEA ..... SEASTROM INCORPORATED
SEL ..... SELECTRO CORPORATION
SEM ..... SEMIKRON
SEV ..... SEVENTY-THREE MANUFACTURING COMPANY
SGL ..... SGL INDUSTRIES
SGS ..... SGS
SIE ..... SIEMENS
SIG ..... SIGNETICS
SIM ..... SIMPSON
SLE ..... SL ELECTRONICS
SOC ..... SOUTHCO
SOE ..... STANDARD OIL ENGINEERING
SOH ..... SOHIO
SOL ..... SOLDAPULLT
SOW ..... SOLDER WICK
SPC ..... SPC TECHNOLOGY
SPE ..... SPECTROL
SPL ..... SPRA-LUBE
SPR ..... SPRAGUE
SPS ..... SPRINGFIELD PAPER SPECIALISTS
SQR ..... SQR SECURITY COMPONENTS
SSI ..... SWITCHING SYSTEMS INTERNATIONAL
SSM ..... SOLD STATE MICROWAVE
SSS ..... S & S TECH
SST ..... SST
STA ..... STANCOR
STB ..... SEAL-TITE BAG COMPANY
STI ..... STIMPSON
STM ..... SEASTROM MANUFACTURING COMPANY
STP ..... STACKPOLE
STW ..... STOCKWELL
SUS ..... SUNSHINE SCIENTIFIC
SWC ..... SWITCHCRAFT
SHW ..... STEWERT-WARNER HOBBS DIVISION
S-B ..... SPEED BEND
S-E ..... STEMCO/ENGLER
S-F ..... SYDNEY FRIEDRICH
S-L ..... SWAGELOCK
S-M ..... STRIP-MASTER
TAB ..... THOMAS & BETTS
TAI ..... TAI CORPORATION
TAN ..... TANSISTOR
TCC ..... THOMSON PASSIVE COMPONENTS CORP
TCI ..... TRA-CON INCORPORATED

TEC ..... TECKNIT
TEL ..... TELEFUNKEN
TEM ..... TEMPIL
TET ..... TECHNITOOL
TFI ..... THRUWAY FASTNERS INCORPORATED
THM ..... THERMALLOY
THS ..... THREADED SCREW PRODUCTS COMPANY
TII ..... TEXAS INSTRUMENTS INCORPORATED
TMS ..... TIMES MICROWAVE SYSTEMS
TRD ..... TRIAD
TRI ..... TRI-COUNTY
TRS ..... TRI-STATE
TRT ..... TRAVERS TOOL COMPANY
TRU ..... TRU CONNECTORS
TRW ..... TRW
TUS ..... TUSONIX
TXS ..... TEXAS SPECTRUM
T-P ..... THOMAS PRODUCTS
UEC ..... UNITED ELECTRIC
ULI ..... ULINE
UNC ..... UNICORP
UN ..... UNELCO
UNI ..... UNIROYAL
UNM ..... UNIMEC
USC ..... USECO
UTI ..... UTICA
V-C ..... VICOR INC.
VFL ..... VITAFOAM LIMITED
VIC ..... VICTOREEN
VIT ..... VITRAMON
VLR ..... VLEIR
VOL ..... VOLTRONICS CORPORATION
WAG ..... WAGO COPR
WAK ..... WAKEFIELD
WAL ..... WALDOM
WCO ..... WECO
WEC ..... WESTERN ENTERPRISES COMAPNY
WEI ..... WEICO
WEL ..... WELLER
WES ..... WEINSTEIN
WGV ..... WARREN G-V
WIE ..... WIELAND
WIL ..... WILTRON
WIS ..... WEBER INDUSTRIAL SUPPLY COMPANY
WIT ..... WITTEK DIVISION, A MICRODOT COMPANY
WPI ..... WIRE PRODUCTS INCORPORATED
WPS ..... WORKPLACE SYSTEM
WSC ..... WEST POINT SUPPLY COMPANY
WWP ..... WESTERN WIRE PRODUCTS
W-E ..... WELLS ELECTRONIC INCORPORATED
W-I ..... WEIDMULLER INCORPORATED
W-L ..... WARD LEONARD
XAC ..... X-ACTO
XCA ..... XCELITE

YNG ..... YOUNGS
YPC ..... YARDLEY PRODCTS CORPORATION
ZER ..... ZERO MANUFACTURING COMPANY
ZIE ..... ZIERIC

BILL NO: 1010856-501M REV: D U/M: EA DRAWING NO:
MDL,MODEL 120S1G3

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1009097	A	BLOCK DIAG,100S1G4	EA	REF	ARC-D\1009097	R(B)
0020	1009611	C	INTERCONNECTION DIAG	EA	REF	ARC-D\1009611	R(B)
0030	1009331	-	ASSY DWG,MODEL 100S1G4	EA	REF	ARC-D\1009331	R(B)
0040	1010751-501	-	MODEL 120S1G3,0.8-3.0GHz,120 WATTS	EA	REF		BOM
0050	1009336	-	ASSY DWG,AMP 100S1G4	EA	REF	ARC-D\1009336	R(B)
0060	1010926-501	-	AMP ASSY,120S1G3	EA	REF	ARC-D\1009336	BOM
0070	1010027	B	ASSY DWG,RF/PWR SUPPLY	EA	REF	ARC-D\1010027	R(B)
0080	1010927-501	A	RF/PWR SUPPLY ASSY	EA	REF	ARC-D\1010027	BOM
0085	1011777-501	-	CABLE KIT,MODEL 100S1G4/120S1G3	EA	REF		BOM
0090	1009615	-	ASSY DWG,CABLE,(OUTPUT),COAX,SEMI-RIGID	EA	REF	ARC-B\1009615	B
0100	1009615-501	-	CABLE ASSY,(OUTPUT),COAX,SEMI-RIGID	EA	REF	ARC-B\1009615	BOM
0110	1009614	A	ASSY DWG,CABLE,(INPUT),COAX,SEMI-RIGID	EA	REF	ARC-B\1009614	B
0120	1009614-501	-	CABLE ASSY,(INPUT),COAX,SEMI-RIGID	EA	REF	ARC-B\1009614	BOM
0130	1010022	-	ASSY DWG,CABLE (INPUT),COAX,SEMI-RIGID	EA	REF	ARC-B\1010022	B
0140	1010022-501	A	CABLE ASSY,(INPUT),COAX,SEMI-RIGID	EA	REF	ARC-B\1010022	BOM
0150	1010026	-	ASSY DWG,(INPUT),COAX,SEMI-RIGID,SMA/SMA	EA	REF	ARC-B\1010026	B
0160	1010026-501	-	CABLE ASSY,(INPUT),COAX,SEMI-RIGID,SMA/SMA	EA	REF	ARC-B\1010026	BOM
0170	1010023	-	ASSY DWG,CABLE (INPUT),COAX,SEMI-RIGID	EA	REF	ARC-B\1010023	B
0180	1010023-501	-	CABLE ASSY,(INPUT),COAX,SEMI-RIGID	EA	REF	ARC-B\1010023	BOM
0190	1010013	A	SCHEM DIAG,LO LVL AMP	EA	REF	ARC-B\1010013	B
0200	1009352	B	ASSY DWG,LOW LEVEL ASSY,100S1G4	EA	REF	ARC-C\1009352	R(A)
0210	1009352-501	C	ASSY,LO LVL AMP	EA	REF	ARC-C\1009352	BOM
0220	1009228	-	SCHEM DIAG,PRE-AMP/ATTEN	EA	REF	ARC-C\1009228	R(A)
0230	1009226	D	ASSY DWG,PRE-AMP/ATTENUATOR	EA	REF	ARC-C\1009226	R(A)

BILL NO: 1010856-501M REV: D U/M: EA DRAWING NO:
MDL,MODEL 120S1G3

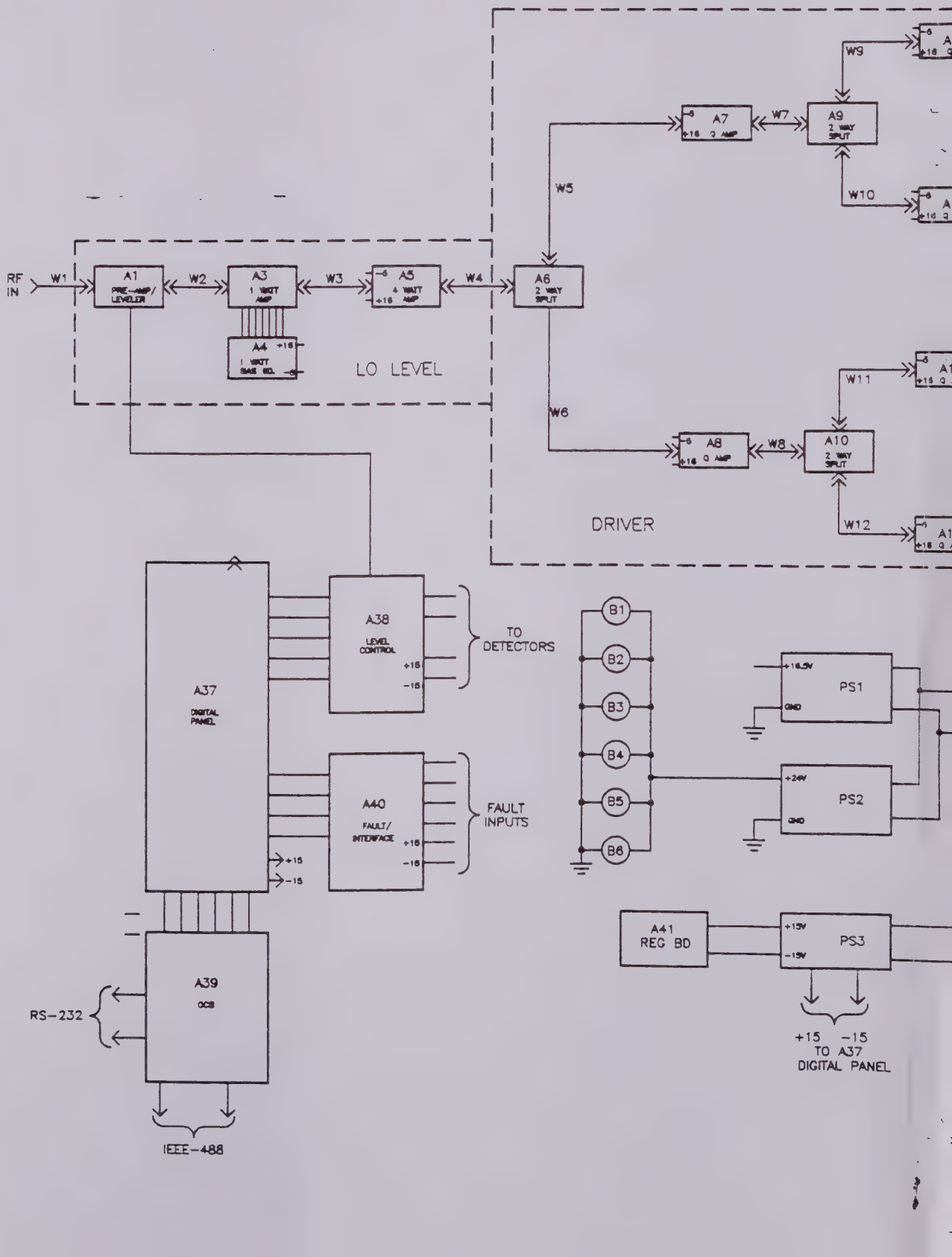
SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0240	1009226-501	D	PRE-AMP/ATTENUATOR ASSY	EA	REF	ARC-C\1009226	BOM
0250	1010749	B	SCHEM DIAG,BIAS CTRL	EA	REF	ARC-C\1010749	B
0260	1010591	A	SCHEM DIAG,LOW LEVEL "S" MODULE	EA	REF	ARC-B\1010591	B
0270	1010589	D	ASSY DWG,LOW LEVEL "S" MODULE	EA	REF	ARC-C\1010589	R(A)
0280	1010589-501	C	PWB ASSY,LOW LEVEL "S" MODULE	EA	REF	ARC-C\1010589	BOM
0290	1010902	A	SCHEM DIAG,BIAS CONTROL	EA	REF	ARC-B\1010902	B
0300	1010748	A	ASSY DWG,BIAS CTRL,1W S MODULE	EA	REF	ARC-C\1010748	R(A)
0310	1010748-501	B	PWB ASSY,BIAS CTRL,1W S MODULE	EA	REF	ARC-C\1010748	BOM
0320	1009543	B	SCHEM,4 WATT AMP	EA	REF	ARC-C\1009543	R(A)
0330	1009542	D	ASSY DWG,4 WATT AMP ASSY	EA	REF	ARC-C\1009542	R(A)
0340	1009542-501	B	4 WATT AMP ASSY	EA	REF	ARC-C\1009542	BOM
0350	1010015	-	SCHEM DIAG,TOP HEATSINK ASSY	EA	REF	ARC-B\1010015	B
0360	1009690	A	ASSY DWG,HEATSINK,TOP SIDE	EA	REF	ARC-D\1009690	R(B)
0370	1010930-501	-	HEATSINK ASSY,TOP	EA	REF	ARC-D\1009690	BOM
0380	1010014	-	SCHEM DIAG,RIGHT HEATSINK ASSY	EA	REF	ARC-B\1010014	B
0390	1009469	A	ASSY DWG,HEATSINK,RS	EA	REF	ARC-D\1009469	R(B)
0400	1010928-501	-	HEATSINK ASSY,RS	EA	REF	ARC-D\1009469	BOM
0410	1010016	-	SCHEM DIAG,LEFT HEATSINK ASSY	EA	REF	ARC-B\1010016	B
0420	1009689	A	ASSY DWG,HEATSINK,LS	EA	REF	ARC-D\1009689	R(B)
0430	1010929-501	-	HEATSINK ASSY,LS	EA	REF	ARC-D\1009689	BOM
0440	1008630	-	ASSY DWG,2 WAY SPLITTER	EA	REF	ARC-B\1008630	B
0450	1008630-501	-	PWB ASSY,2 WAY SPLITTER	EA	REF	ARC-B\1008630	BOM
0460	1010919	-	SCHEMATIC,QUAD AMP	EA	REF	ARC-C\1010919	R(A)
0470	1010886	A	ASSY DWG,PWB,QUAD AMP	EA	REF	ARC-A\1010886	A

BILL NO: 1010856-501M REV: D U/M: EA DRAWING NO:
MDL,MODEL 120S1G3

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0480	1010886-501	C	PWB ASSY,QUAD AMP	EA	REF	ARC-A\1010886	BOM
0482	1009161-501	K	PWB ASSY,QUAD AMP,100S1G4	EA	REF	ARC-A\1009161	R(B)
0485	1010074	-	SCHEM DIAG,4 WAY SPLITTER #3	EA	REF	ARC-B\1010074	B
0490	1010072	A	ASSY DWG,4 WAY SPLITTER #3	EA	REF	ARC-D\1010072	B
0500	1010072-501	A	PWB ASSY,4 WAY SPLITTER #3	EA	REF	ARC-D\1010072	BOM
0510	1009470	C	ASSY DWG,PWR SUPPLY ASSY,100S1G4	EA	REF	ARC-D\1009470	R(B)
0520	1009470-501	H	PWR SUPPLY/COMBINER ASSY	EA	REF	ARC-D\1009470	BOM
0530	1009720	-	SCHEM DIAG,REGULATOR BD,100S1G4	EA	REF	ARC-B\1009720	B
0540	1009718	A	ASSY DWG,REGULATOR BD,100S1G4	EA	REF	ARC-B\1009718	B
0550	1009718-501	A	PWB ASSY,REGULATOR BD/100S1G4	EA	REF	ARC-A\1009718	BOM
0560	1009692	-	SCHEM DIAG,FAULT DETECT BD,100S1G4	EA	REF	ARC-D\1009692	R(B)
0570	1009582	-	ASSY DWG,FAULT DETECT BD/100S1G4	EA	REF	ARC-C\1009582	R(A)
0580	1009582-501	-	PWB ASSY,FAULT DETECT BD/100S1G4	EA	REF	ARC-A\1009582	BOM
0590	1009893	A	SCHEM DIAG,REMOTE INTERFACE	EA	REF	ARC-D\1009893	R(B)
0600	1009892	D	ASSY DWG,REMOTE INTERFACE	EA	REF	ARC-C\1009892	R(A)
0610	1009892-501	D	PWB ASSY,REMOTE INTERFACE	EA	REF	ARC-C\1009892	BOM
0620	1009958	B	SCHEM DIAG,ALC BD	EA	REF	ARC-D\1009958	R(B)
0630	1009957	B	ASSY DWG,ALC BD	EA	REF	ARC-C\1009957	R(A)
0640	1009957-501	B	ALC BD ASSY	EA	REF	ARC-C\1009957	BOM
0650	1009320	A	SCHEM DIAG,CONTROLLER/4 LINE DISPLAY	EA	REF	ARC-B\1009320	B
0660	1009464	C	ASSY DWG,CTRL PNL	EA	REF	ARC-D\1009464	R(B)
0670	1010933-501	A	CTRL PNL ASSY	EA	REF	ARC-D\1009464	BOM
0680	1009318	F	ASSY DWG,CONTROLLER/4 LINE DISPLAY	EA	REF	ARC-D\1009318	R(B)
0690	1009318-502	E	PWB ASSY,CONTROLLER/4 LINE DISPLAY	EA	REF	ARC-D\1009318	BOM

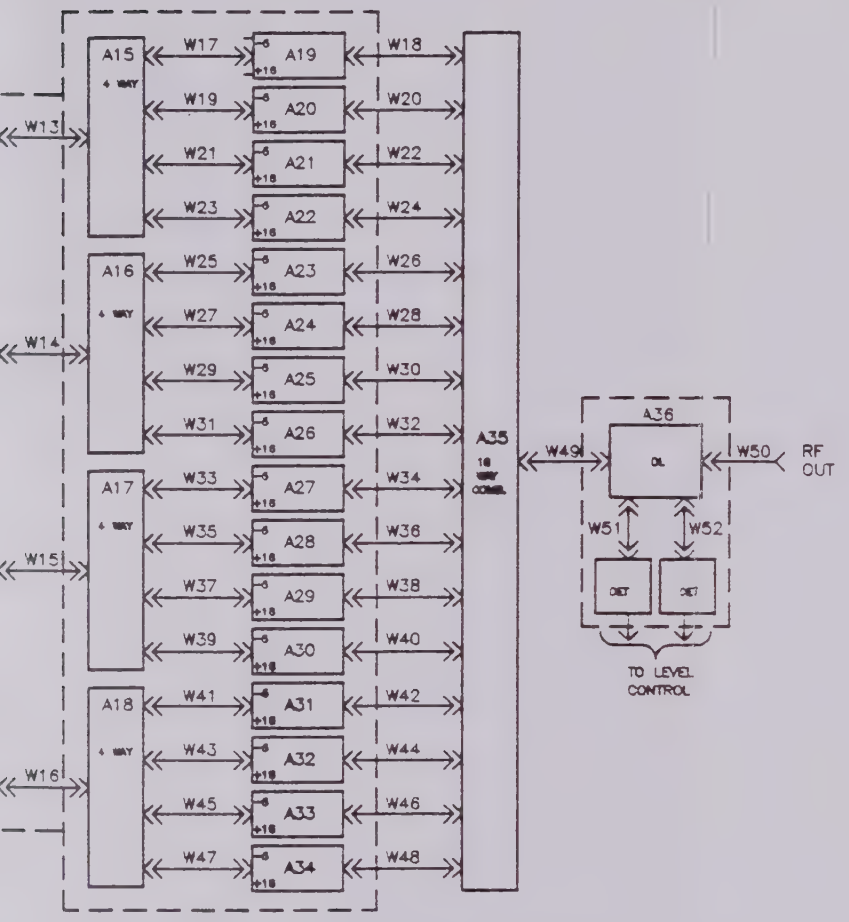
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MDL,MODEL 120S1G3

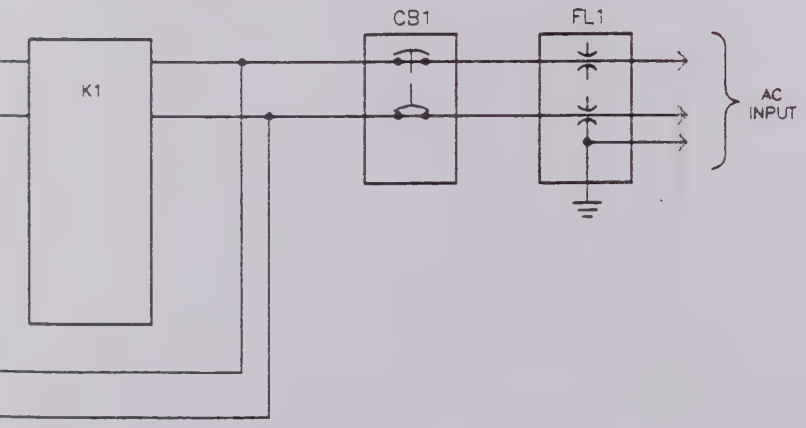
SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0700	1009903	A	ASSY DWG,DISPLAY	EA	REF	ARC-C\1009903	R(A)
0710	1009903-501	A	DISPLAY ASSY	EA	REF	ARC-B\1009903	BOM
0720	1009467	A	ASSY DWG,DIRECTIONAL DETR	EA	REF	ARC-D\1009467	R(A)
0730	1009467-501	-	DIRECTIONAL DETR ASSY	EA	REF	ARC-D\1009467	BOM
0740	1009723	-	SCHEM DIAG,DETECTOR BD/100S1G4	EA	REF	ARC-B\1009723	B
0750	1009721	-	ASSY DWG,DETECTOR BD/100S1G4	EA	REF	ARC-B\1009721	B
0760	1009721-501	A	PWB ASSY,DETECTOR BD/100S1G4	EA	REF	ARC-B\1009721	BOM


RF IN
W1
A1
PRE-AMP/ LEVELER
W2
A3
1 WATT AMP
W3
A5
4 WATT AMP
+15
W4
A6
2 WAY SPLIT
A4
1 WATT BIAS MOD.
LO LEVEL
W5
W6
A7
+15 Q AMP
W7
A9
2 WAY SPLIT
W9
W10
A8
+15 Q AMP
W8
A10
2 WAY SPLIT
W11
W12
DRIVER
A37
DIGITAL PANEL
A38
LEVEL CONTROL
+15
-15
TO DETECTORS
A40
FAULT/ INTERFACE
FAULT INPUTS
B1
B2
B3
B4
B5
B6
PS1
+16.5V
GND
PS2
+24V
GND
A41
REG BD
PS3
+15V
-15V
+15 -15
TO A37
DIGITAL PANEL
A39
OCB
RS-232
IEEE-488

REL NO 1136-03

ECN	DATE
P.C.	
10321	





ITEM	PART NO.	DESCRIPTION	MARK	FIN	MATL
QTY. REQD.	PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL COARSE, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

DECIMALS	2 PLACE	3 PLACE
UP TO 6	±.02	±.005
OVER 6 TO 24	±.05	±.010
OVER 24	±.10	±.015

ANGULAR DIMENSIONS ±1°

DRAWN J.J.REED DATE 20 NOV 97
CHKD A.REED DATE 24 SEPT 98
MECH J.MAGINN DATE 18 JUNE 98
ELEC F.SCHIRK DATE 09 JUNE 98

AMPLIFIER RESEARCH

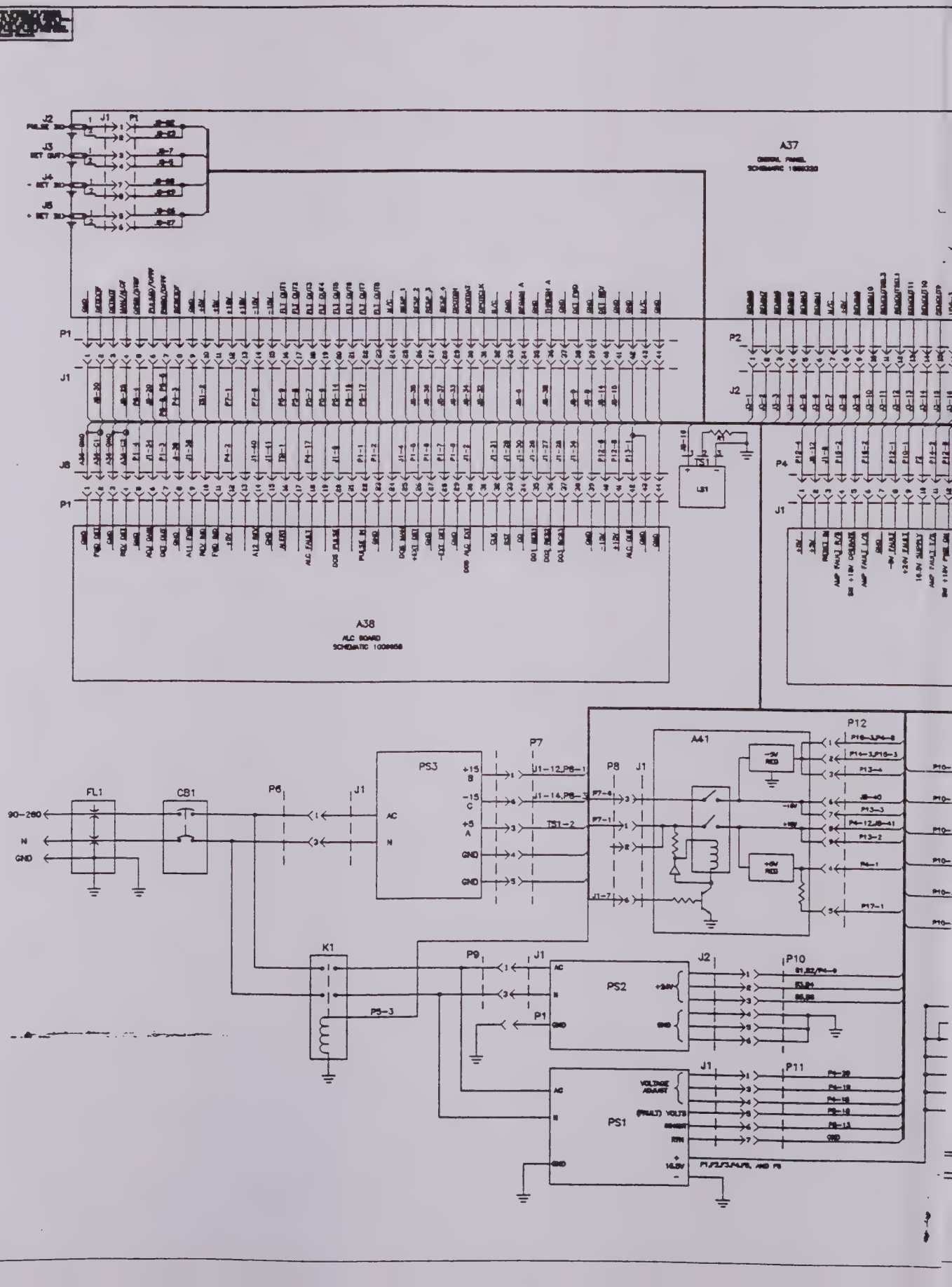
BLOCK DIAGRAM
100S1G4

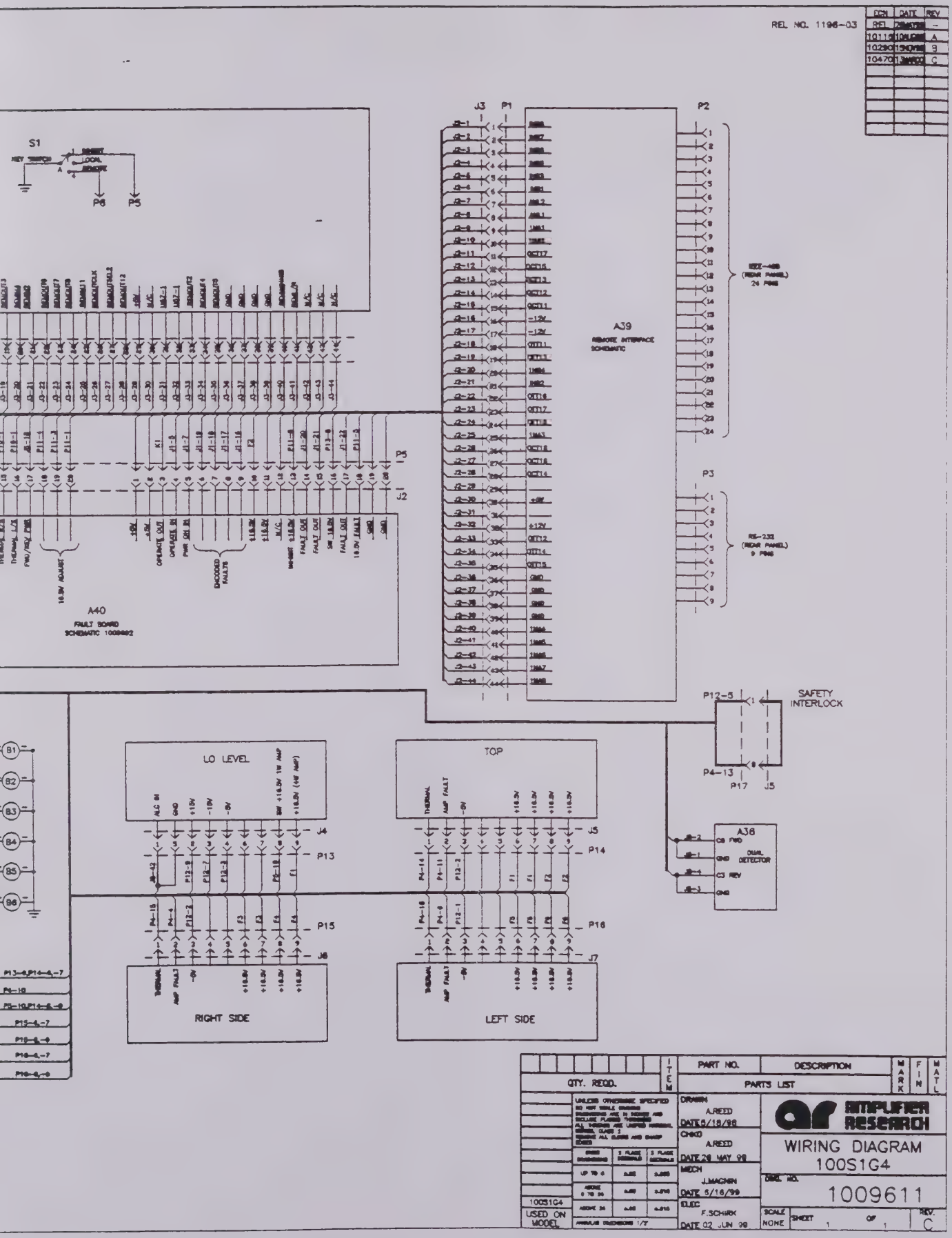
DWG. NO. 1009097

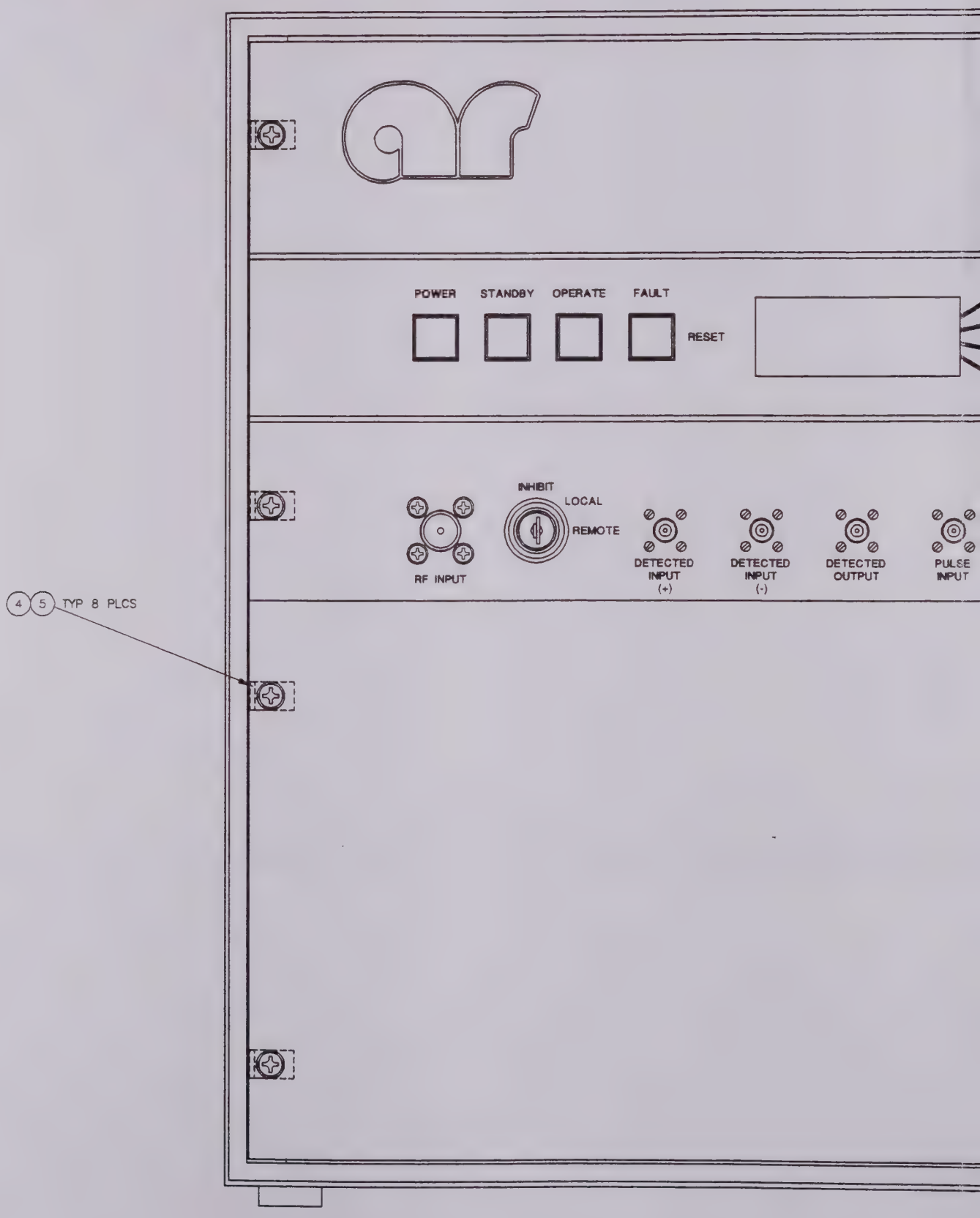
100S1G4

USED ON MODEL

SCALE NONE SHEET 1 OF 1 REV. A

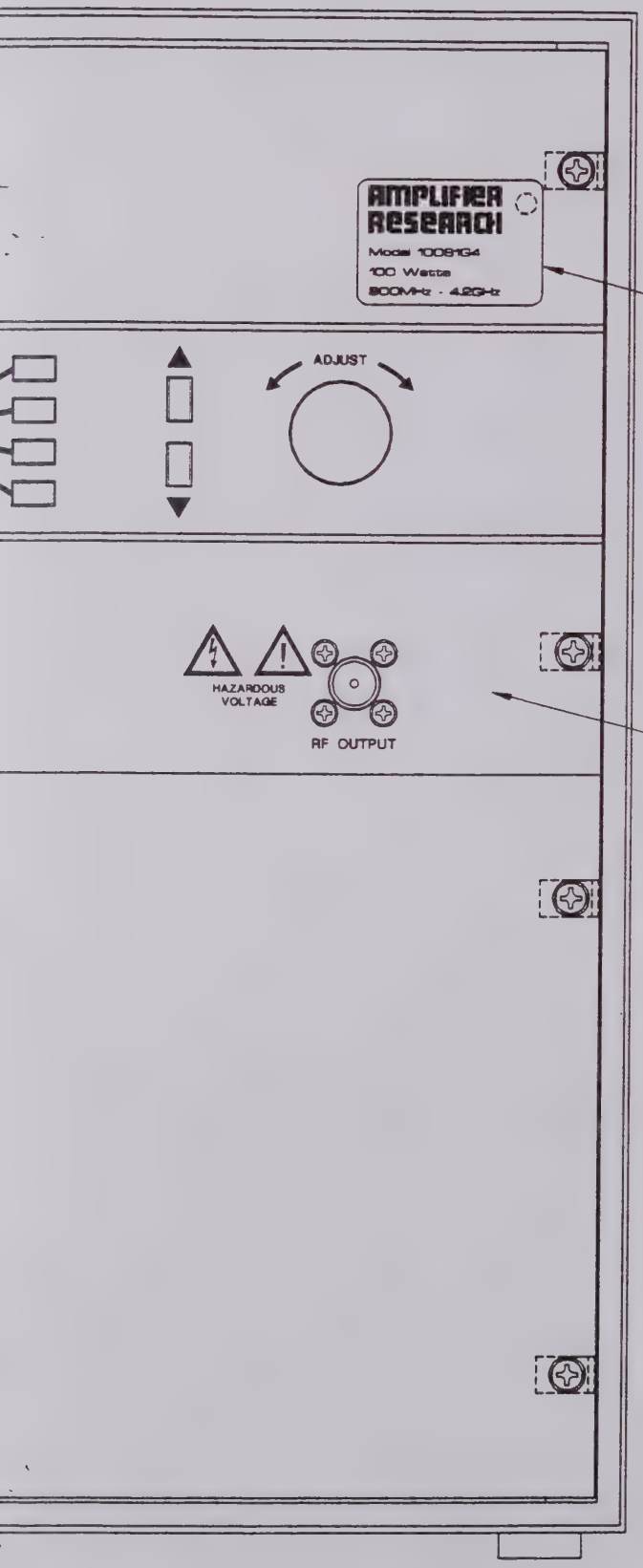

A37
A38
ALC BOARD
SCHEMATIC 1009658
PS3
PS2
PS1
A41
FL1
CB1
K1
90-260
N
GND
+15 B
-15 C
+5 A
GND
GND
AC
N
+24V
GND
VOLTAGE ADJUST
(FAULT) VOLTS
RTN
+ 16.5V -
P1
P2
P3
P4
P5
P6
P7
P8
P9
P10
P11
P12
J1
J2
J3
J4
J5
TS1
L1
L2
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L99
L100


REL NO. 1196-03
ECN | DATE | REV
REL
10111
10290
10470
S1
P6
P5
J3
P1
P2
A39
REMOTE INTERFACE SCHEMATIC
P3
RS-232 (REAR PANEL) 9 PINS
A40
FAULT BOARD SCHEMATIC 1009492
J1
J2
P12-5
SAFETY INTERLOCK
P4-13
P17
J5
A36
DUAL DETECTOR
LO LEVEL
TOP
J4
P13
J5
P14
P15
J6
P16
J7
RIGHT SIDE
LEFT SIDE
QTY. REQD.
ITEM
PART NO.
DESCRIPTION
PARTS LIST
MARK
FIN
MATL
DRAWN A.REED DATE 5/15/98
CHKD A.REED DATE 28 MAY 98
MECH J.MAGNIN DATE 5/16/99
ELEC F.SCHIRK DATE 02 JUN 99
100S1G4
USED ON MODEL
AMPLIFIER RESEARCH
WIRING DIAGRAM
100S1G4
DWG. NO.
1009611
SCALE NONE
SHEET 1 OF 1
REV. C


POWER
STANDBY
OPERATE
FAULT
RESET
INHIBIT
LOCAL
REMOTE
RF INPUT
DETECTED INPUT (+)
DETECTED INPUT (-)
DETECTED OUTPUT
PULSE INPUT
4 5 TYP 8 PLCS

REL NO. 1196-03

ECN	DATE	REV
REL	28MAY98	–



SHEET	1	2	3
REV	–	–	–

ITEM	PART NO.	DESCRIPTION	MARK	FIN	MATL
QTY. REQD.	PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.01	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.03	±.015

ANGULAR DIMENSIONS ±1°

DRAWN	A.REED
DATE	5/26/98
CHKD	
DATE	
MECH	
DATE	
ELEC	
DATE	

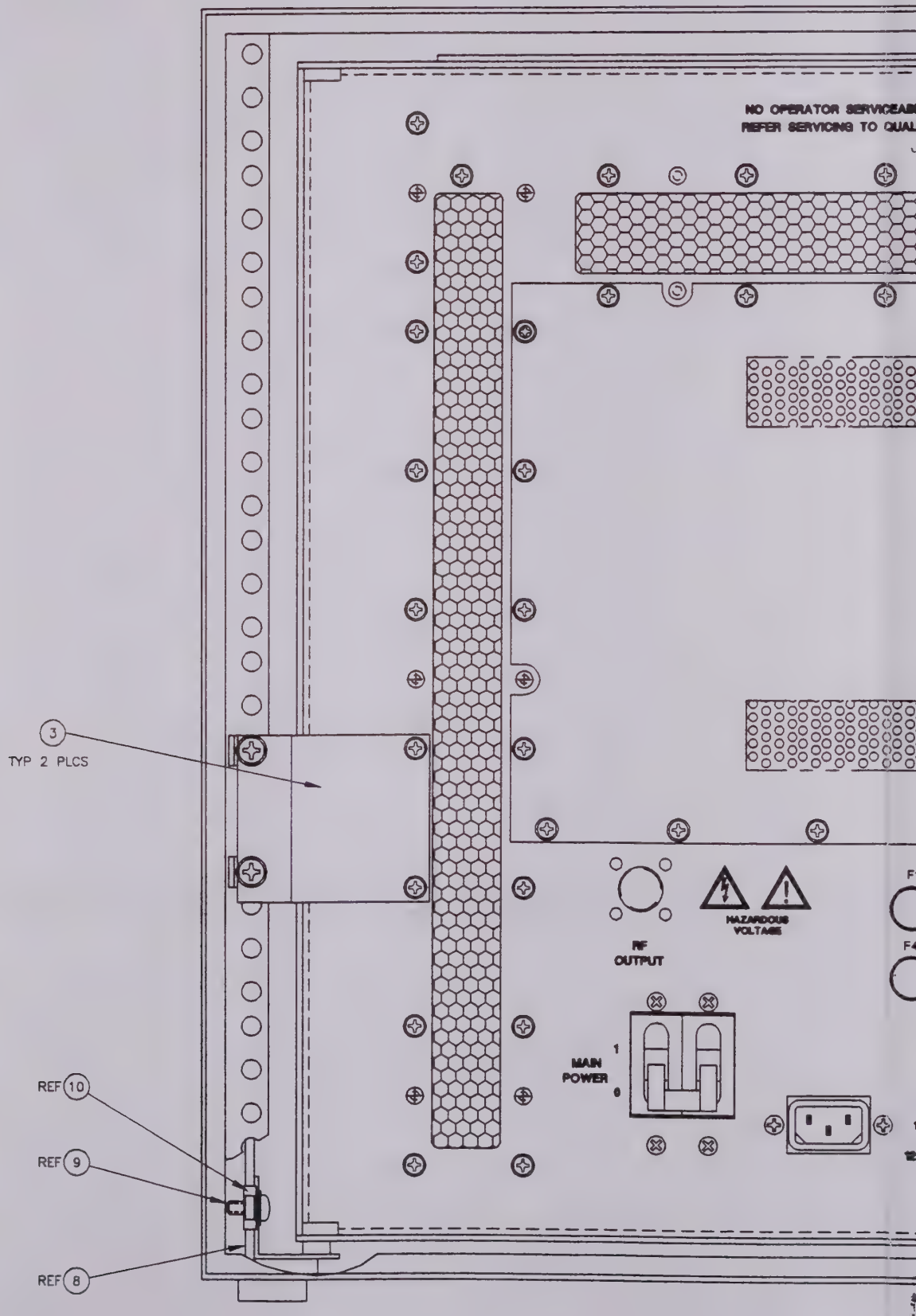
100S1G4
USED ON MODEL

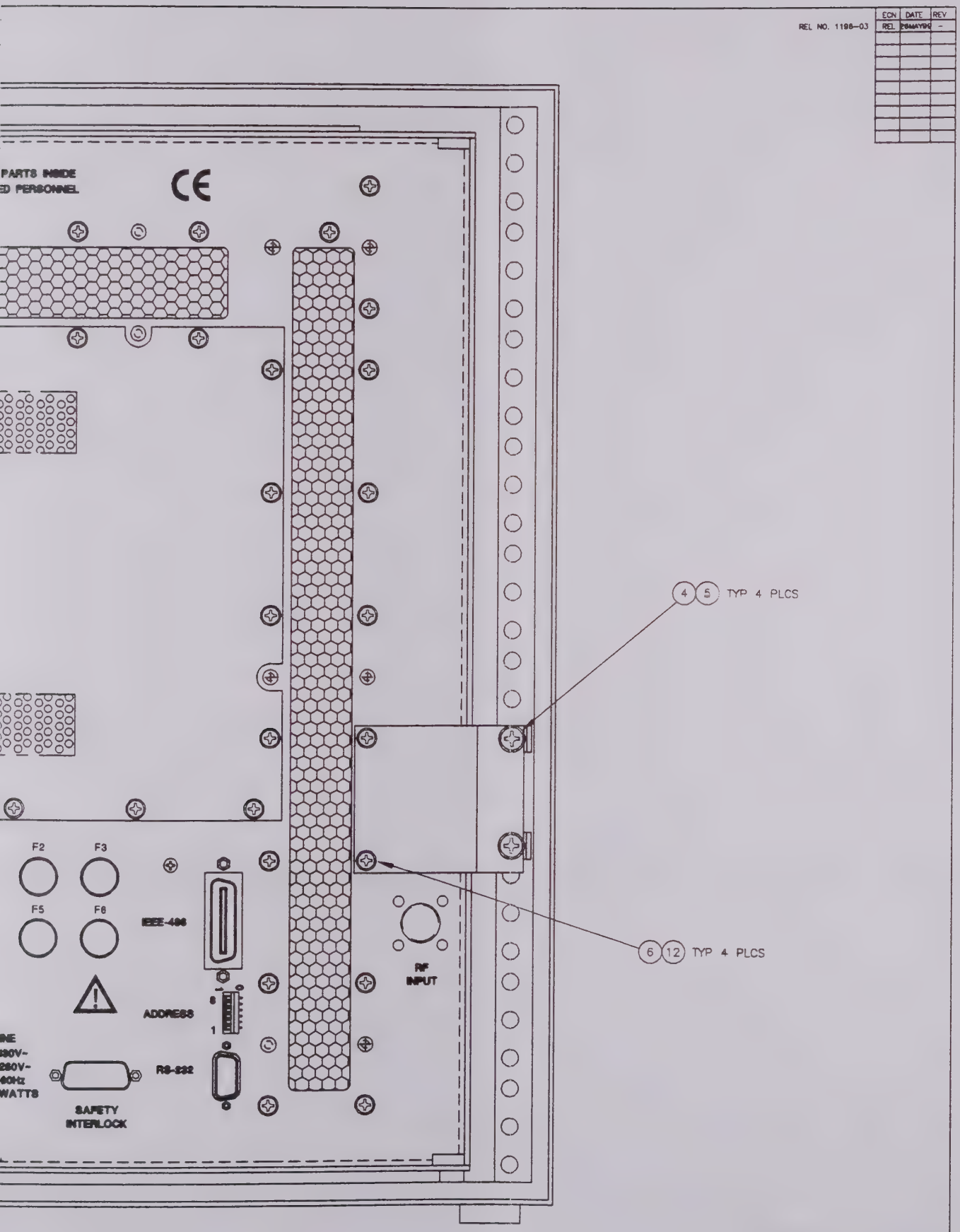
AMPLIFIER RESEARCH

MODEL
100S1G4

DWG. NO.
1009331

SCALE 1/1 | SHEET 1 OF 3 | REV. SEE TABLE

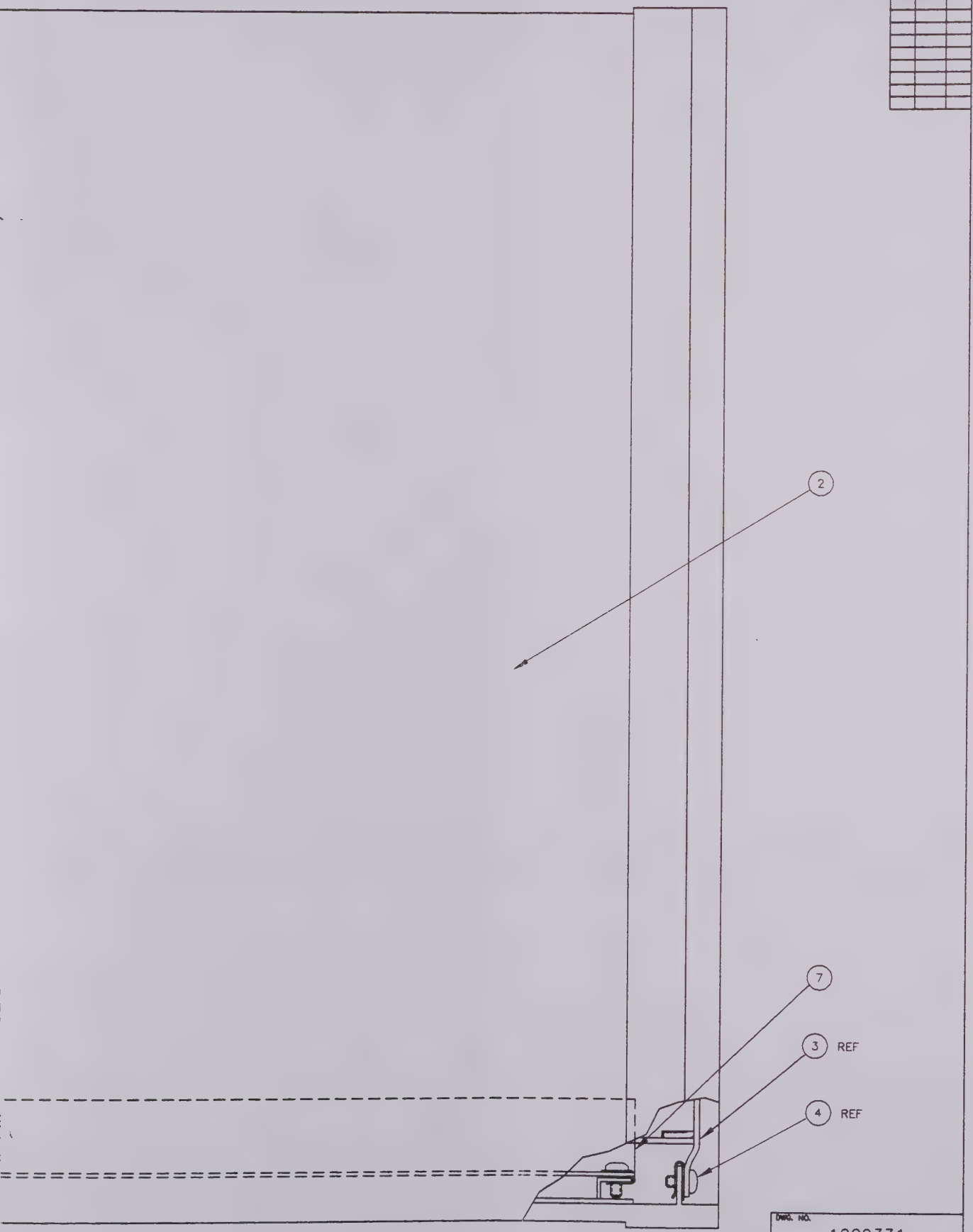

NO OPERATOR SERVICEAB
REFER SERVICING TO QUAL
3
TYP 2 PLCS
HAZARDOUS
VOLTAGE
RF
OUTPUT
MAIN
POWER
1
0
REF 10
REF 9
REF 8


REL NO. 1198-03
ECN
DATE
REV
REL
PARTS INSIDE
ED PERSONNEL
CE
F2
F3
F5
F6
IEEE-488
ADDRESS
RS-232
SAFETY
INTERLOCK
RF
INPUT
4
5
TYP 4 PLCS
6
12
TYP 4 PLCS
DWG. NO.
1009331
SCALE
1/1
SHEET
2
OF
3
REV.
SEE
TABLE


9 TYP 4 PLCS
10 TYP 4 PLCS

REL NO. 1196-03

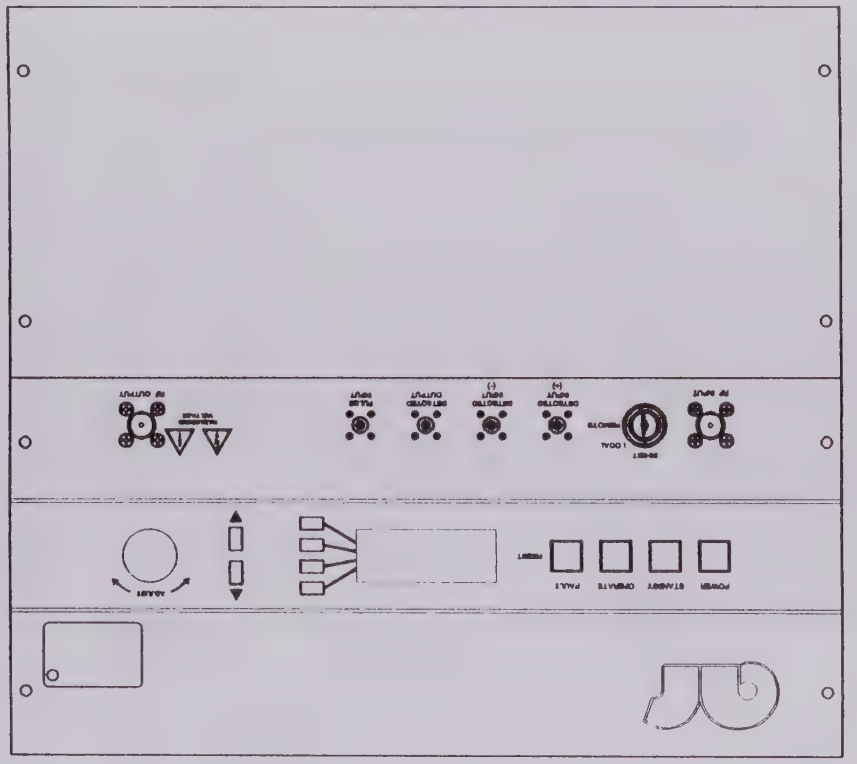
ECN	DATE	REV
REL	28MAY96	-



DWG. NO.		
1009331		
SCALE 1/1	SHEET 3 OF 3	REV. SEE TABLE

BILL NO: 1010751-501 REV: - U/M: EA DRAWING NO:
MODEL 120S1G3,0.8-3.0GHz,120 WATTS

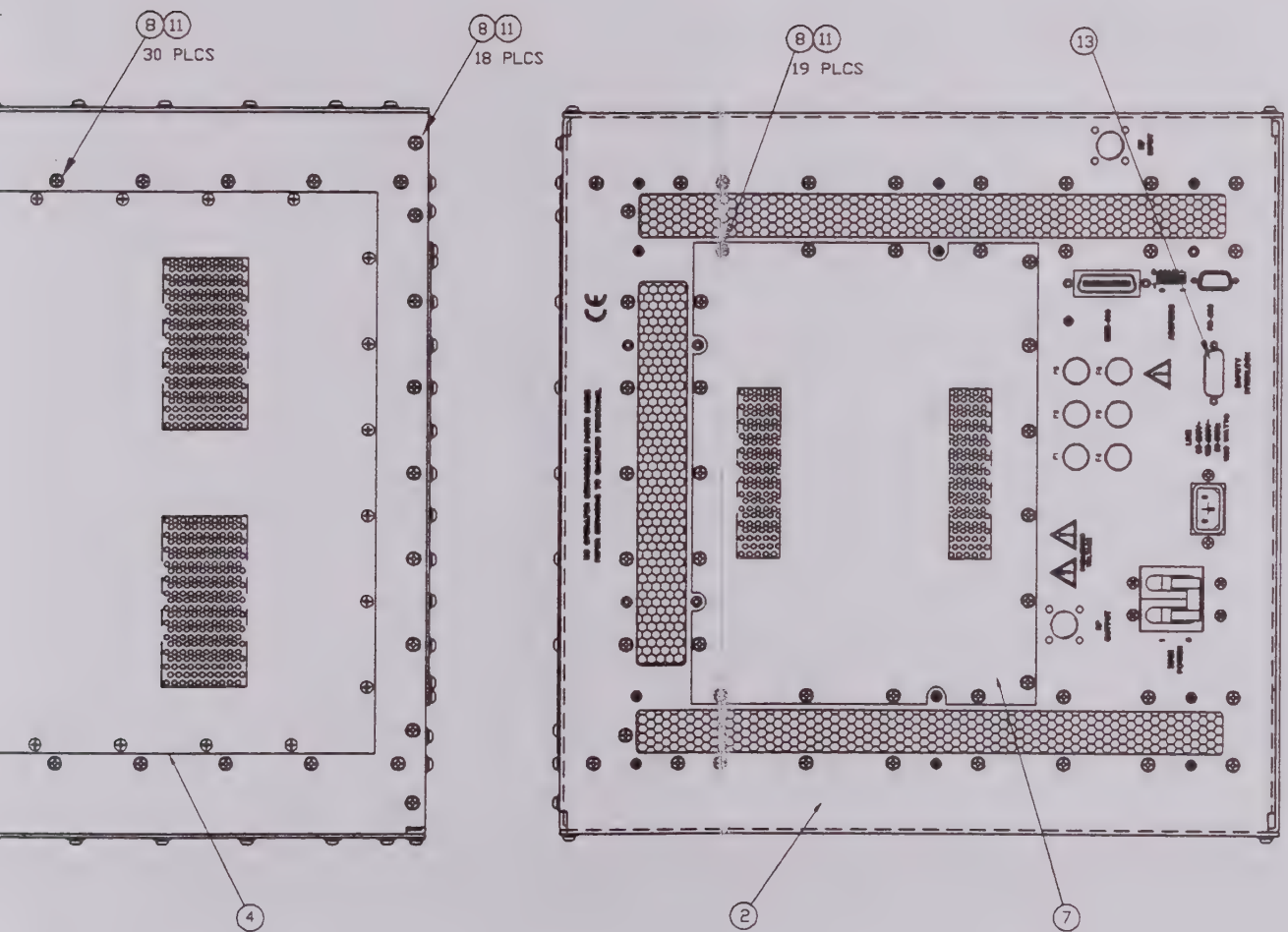
SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1009331	-	ASSY DWG,MODEL 100S1G4	EA	REF	ARC-D\1009331	
0020	1009611	C	INTERCONNECTION DIAG	EA	REF	ARC-D\1009611	
5000	1010926-501	-	AMP ASSY,120S1G3	EA	1.000	ARC-D\1009336	1
5010	1001576-315	V	CABINET,INST CASE,PERF BOT PNL,17.50H,22.88D	EA	1.000	ARC-B\1001576	2
5020	1009341-101	-	BRKT,FINAL ASSY	EA	2.000	ARC-C\1009341	3
5030	94027		SCREW,PNL,DECORATIVE,WITH NYLON WASH	EA	12.000	OPM\HW-1	4
5040	14043		FASTENER,"U" TYPE,10B SCREW,PNL RANGE .125-.160	EA	8.000	ECO\C14810-102	5
5050	11137		SCREW,MACH,PAN HD,CROSS-REC,S/ZN,6-32X.31,TYPE SW	EA	4.000		6
5060	1009613-101	-	ANGLE,SUPPORT GUIDE	EA	2.000	ARC-C\1009613	7
5070	1007226-101-F1-M249	DJ	PL,MODEL NO,120S1G3	EA	1.000	ARC-A\1007226	8
5080	11130		SCREW,MACH,HEX HD SLTD,S/ZN PLTG,#10 X.50,TYPE B	EA	4.000		9
5090	14044		FASTENER,CLIP NUT,"U" TYPE	EA	4.000	5A1\HW-52	10
5110	12048		WASH,LOCK,SPLIT,S/S,#6	EA	4.000	\MS35338-136	12
5120	66150		PWR PLUG,3 COND,14 AWG,6 FEET 7 INCHES	EA	1.000	BEL\17504	13
5170	1010856-501		MANUAL,MODEL 120S1G3	EA	4.000		




(12) 30 PLCS
(2)

ECN	DATE	REV
REL	28MAY99	-

REL NO. 1196-03



SHEET	1	2
REV	-	-

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
			PARTS LIST			

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	0.02	0.005
ABOVE 6 TO 24	0.05	0.010
ABOVE 24	0.10	0.015

ANGULAR TOLERANCE 1/2°

DRAWN A.REED DATE 5/29/98
CHKD A.REED DATE 28 MAY 99
MECH DATE
ELEC DATE

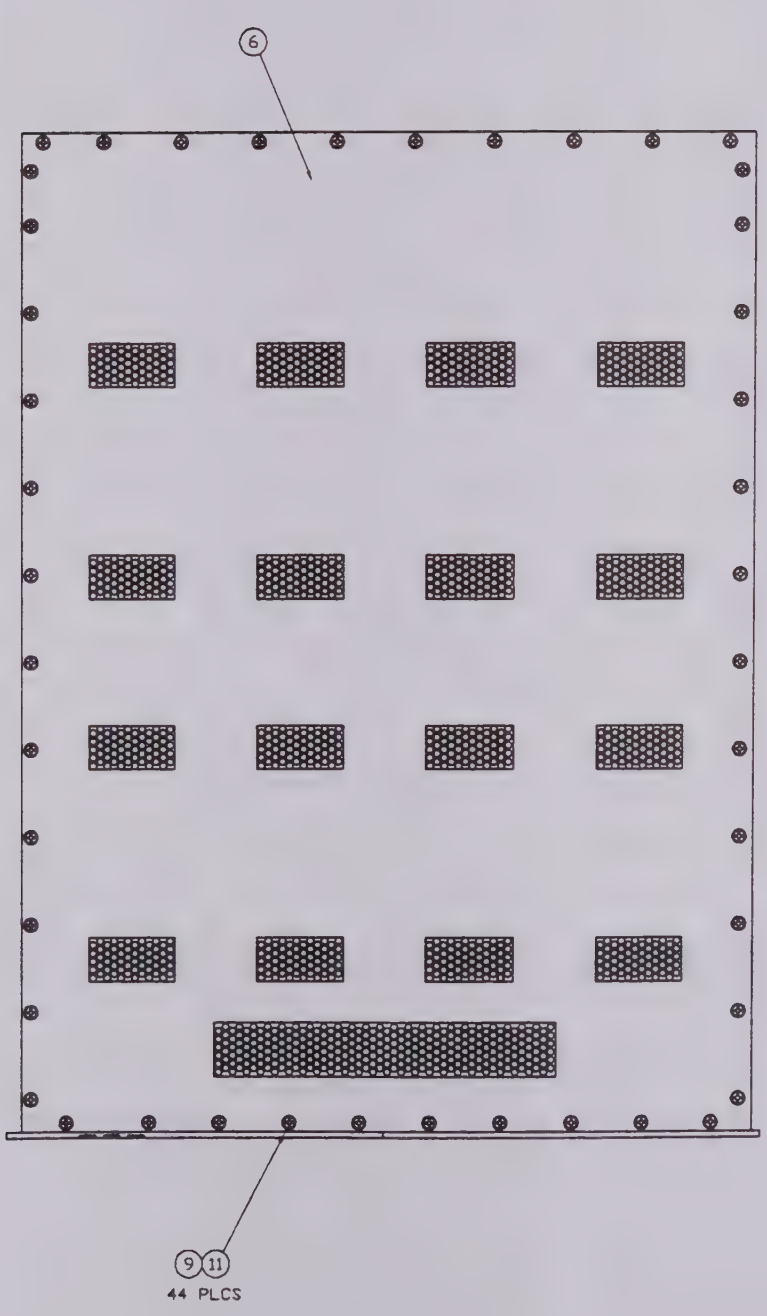
100S1G4
USED ON MODEL

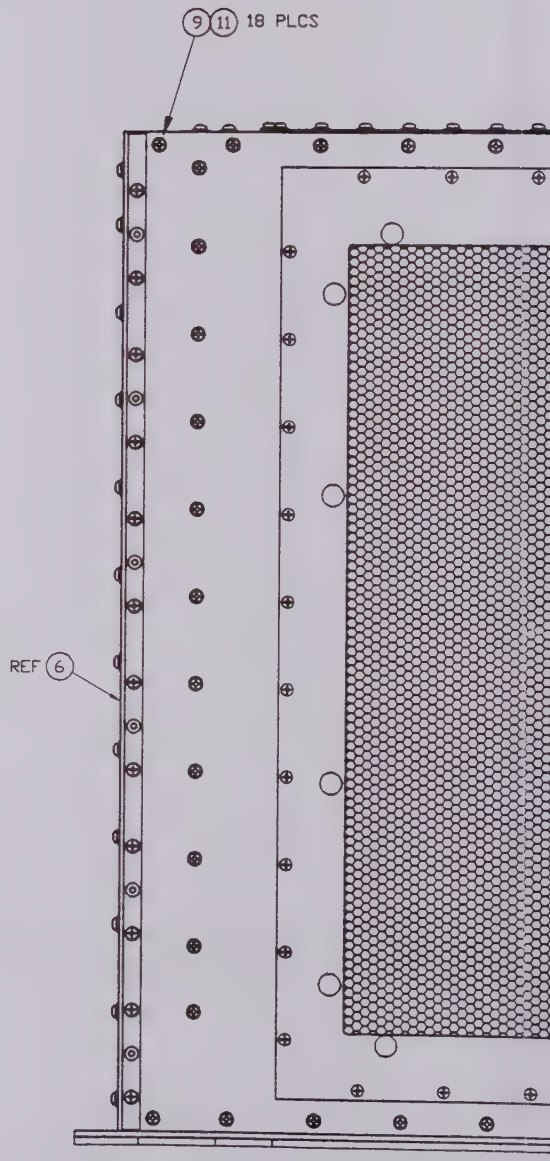
AMPLIFIER RESEARCH

AMP ASSY
100S1G4

DWG. NO.
1009336

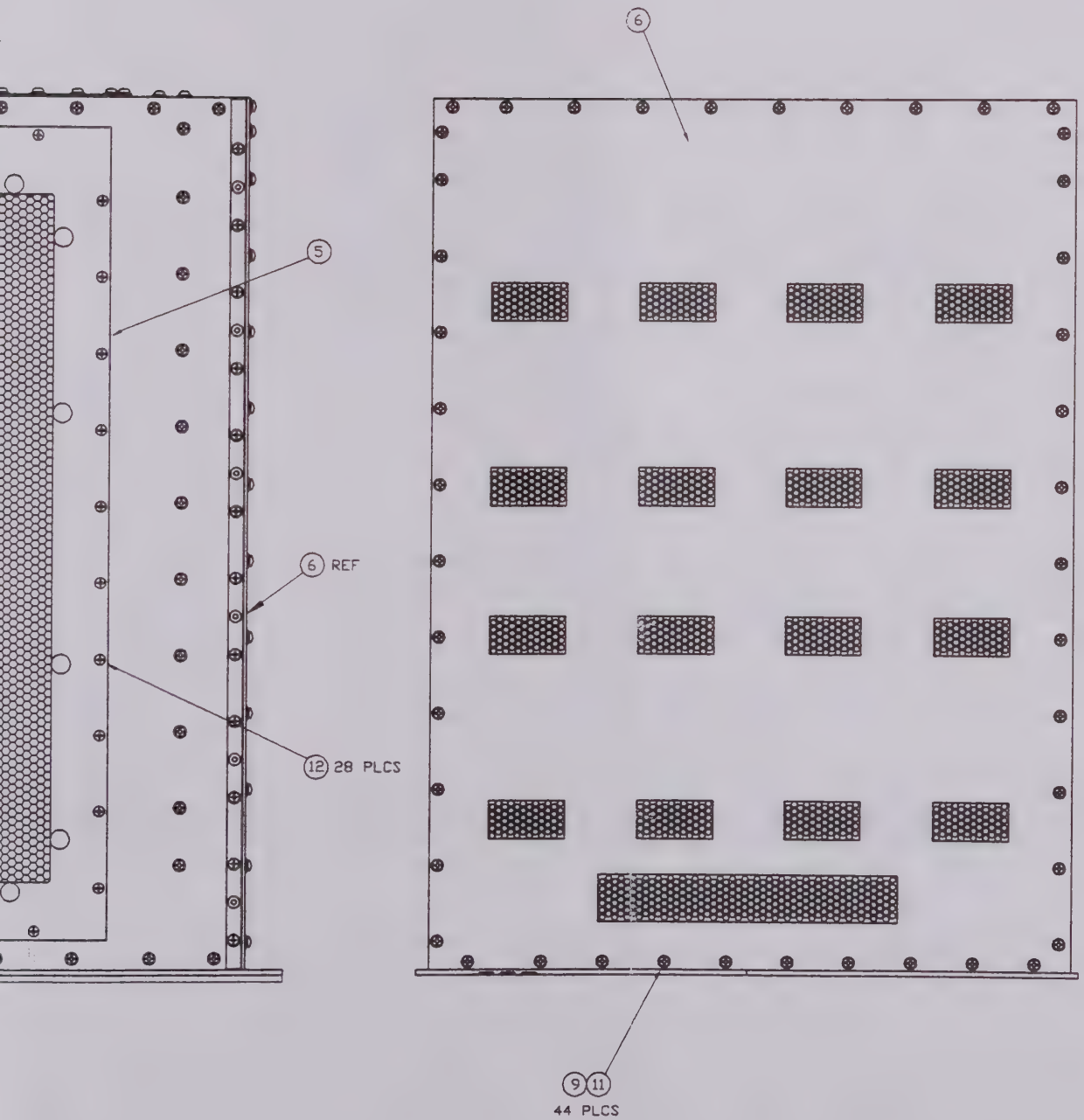
SCALE 1/1 | SHEET 1 OF 2 | REV SEE "ARLE"


6
9 11
44 PLCS


9 11 18 PLCS
REF 6

REL NO. 1196-03

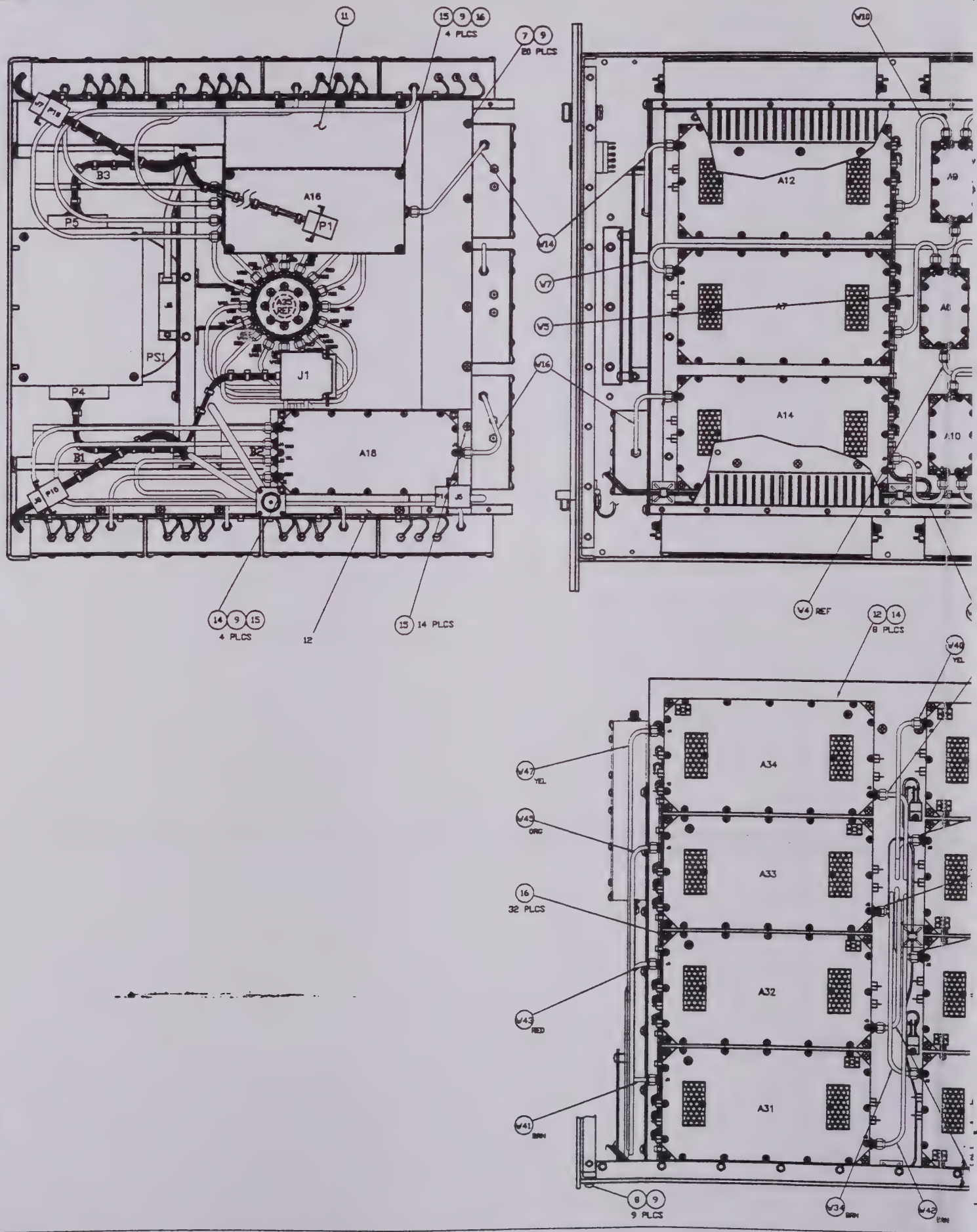
ECN	DATE	REV
REL	28MAY96	-



DWG. NO.			
1009336			
SCALE 1/1	SHEET 2	OF 2	REV. SEE TABLE

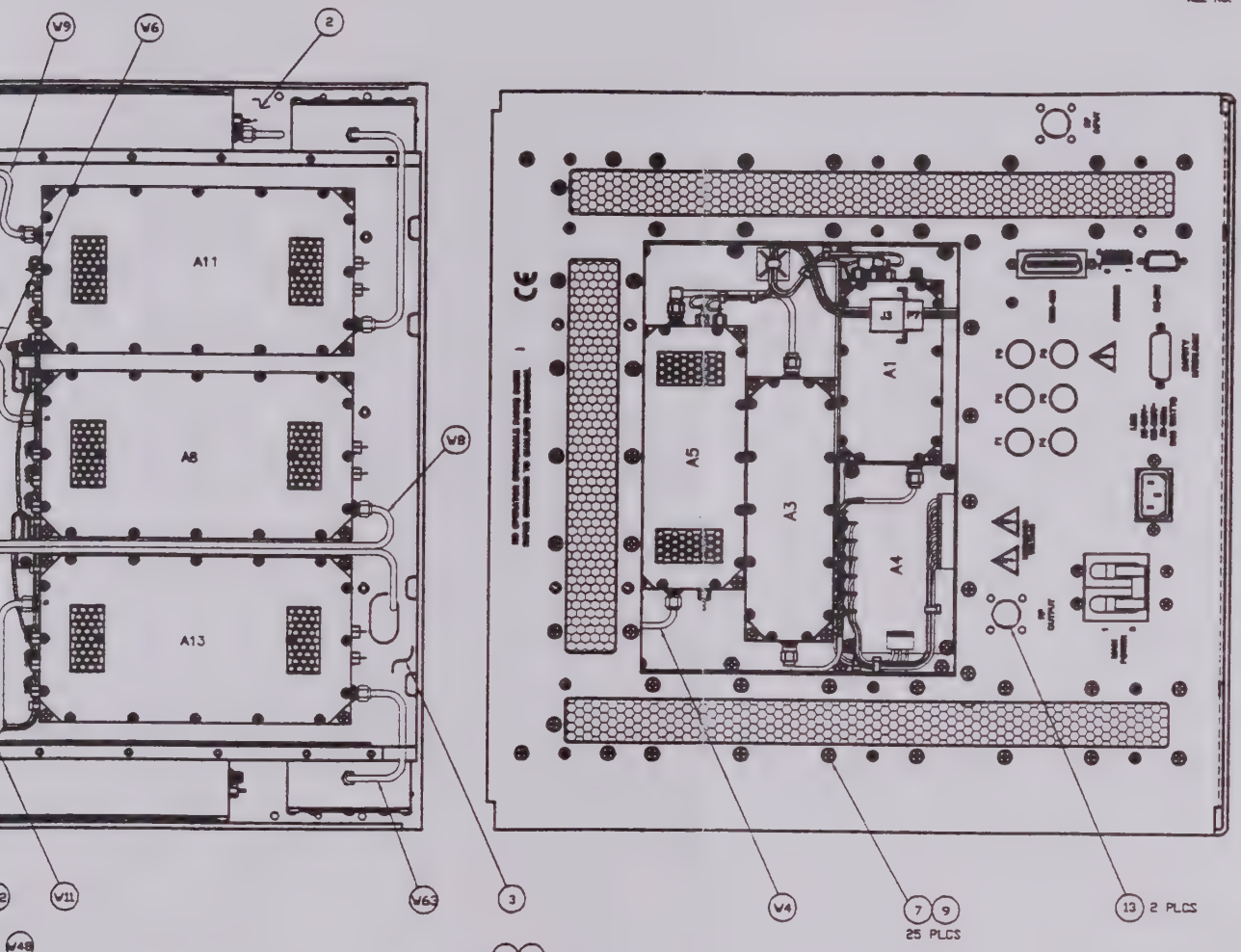
BILL NO: 1010926-501 REV: - U/M: EA DRAWING NO: ARC-D\1009336
AMP ASSY,120S1G3

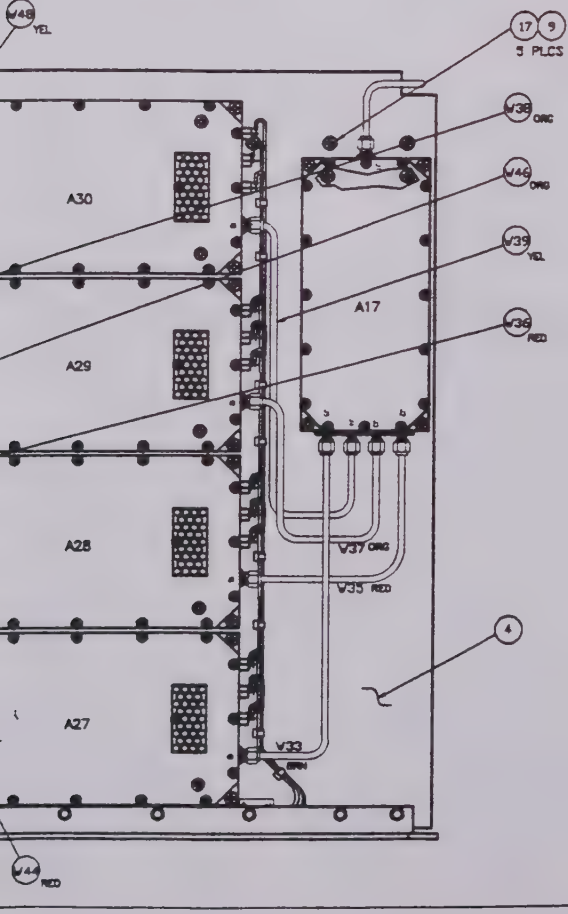
SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1009336	-	ASSY DWG,AMP 100S1G4	EA	REF	ARC-D\1009336	
0100	1010927-501	A	RF/PWR SUPPLY ASSY	EA	1.000	ARC-D\1010027	2
5010	1009334-101	-	COVER,TOP ACCESS	EA	1.000	ARC-D\1009334	4
5020	1009348-101	-	COVER,BOT ACCESS	EA	1.000	ARC-D\1009348	5
5030	1009346-101	-	PNL,SIDE	EA	2.000	ARC-D\1009346	6
5040	1009473-101	-	COVER,ACCESS,REAR PNL	EA	1.000	ARC-C\1009473	7
5050	11016		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X .38	EA	141.000	\MS51957-28	8
5080	12048		WASH,LOCK,SPLIT,S/S,#6	EA	141.000	\MS35338-136	11
5090	11085		SCREW,MACH,FLT HD,100 DEG,CROSS-REC,S/S,4-40 X.25	EA	58.000	\MS24693-C2	12
5100	69393		SWITCHING SHELL,15 PIN SUBMIN"D"	EA	1.000	CIN\DA19678-6	13


11
15 9 16
4 PLCS
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80 PLCS
W10
A16
P1
P5
B3
A12
A9
W14
W7
A7
A8
W5
W16
PS1
J1
P4
A14
A10
A18
B1
B2
J5
P18
W4 REF
14 9 15
4 PLCS
12
15 14 PLCS
12 14
8 PLCS
W40
YEL
W47
YEL
W45
ORG
A34
A33
16
32 PLCS
A32
W43
RED
A31
W41
BRN
8 9
9 PLCS
W39
BRN
W42
BRN

ECN	DATE	REV
REL.	28MAY99	-
10[illegible]	[illegible]	A
10[illegible]	[illegible]	B

REL NO. 1196-03





SHEET	1	2	
REV	B	A	

ITEM	PART NO.	DESCRIPTION	MARK	FIN	MATL
QTY. REQD.	PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL WORKS, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015

ANGULAR DIMENSIONS 1/2°

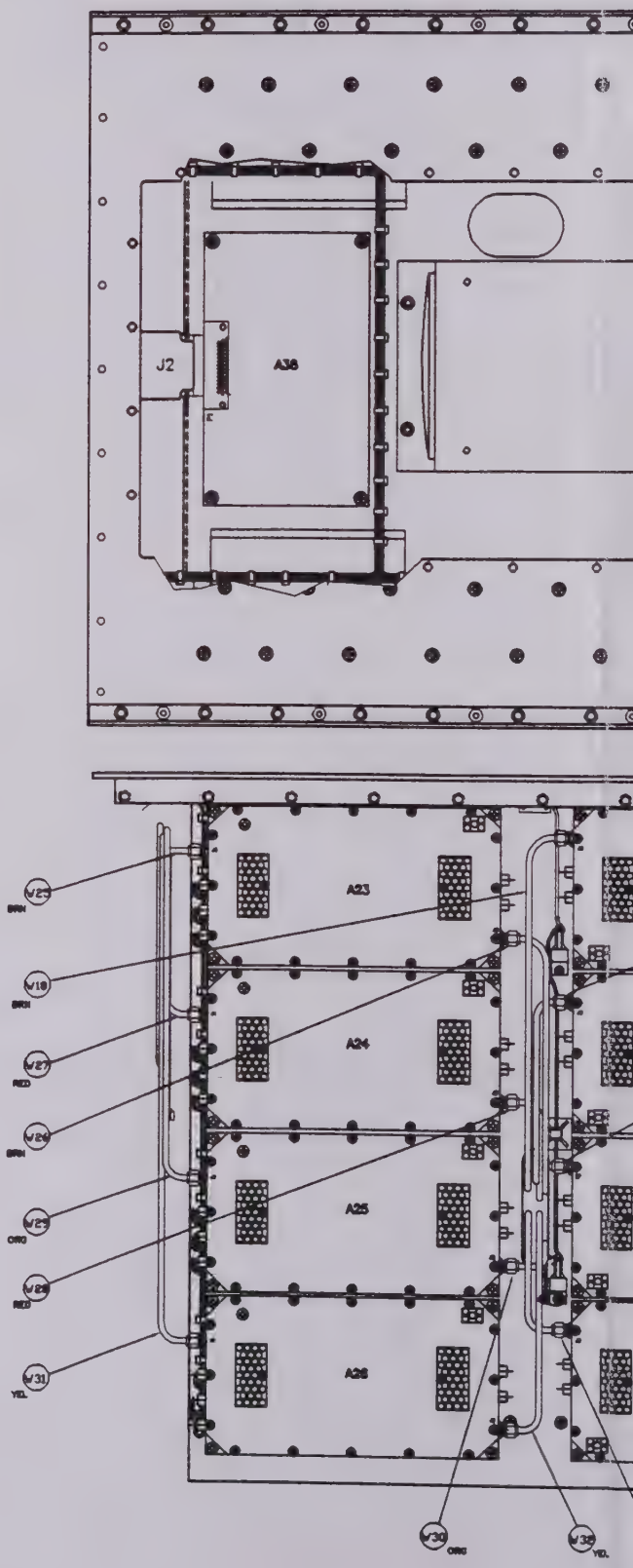
DRAWN	A.REED
	DATE 5/5/99
CHKD	A.REED
	DATE 26 MAY 99
MECH	J.MAGINN
	DATE 16 JUNE 99
ELEC	F.SCHIRK
	DATE 15 JUNE 99

AMPLIFIER RESEARCH

ASSEMBLY DRAWING
RF/PWR SUPPLY

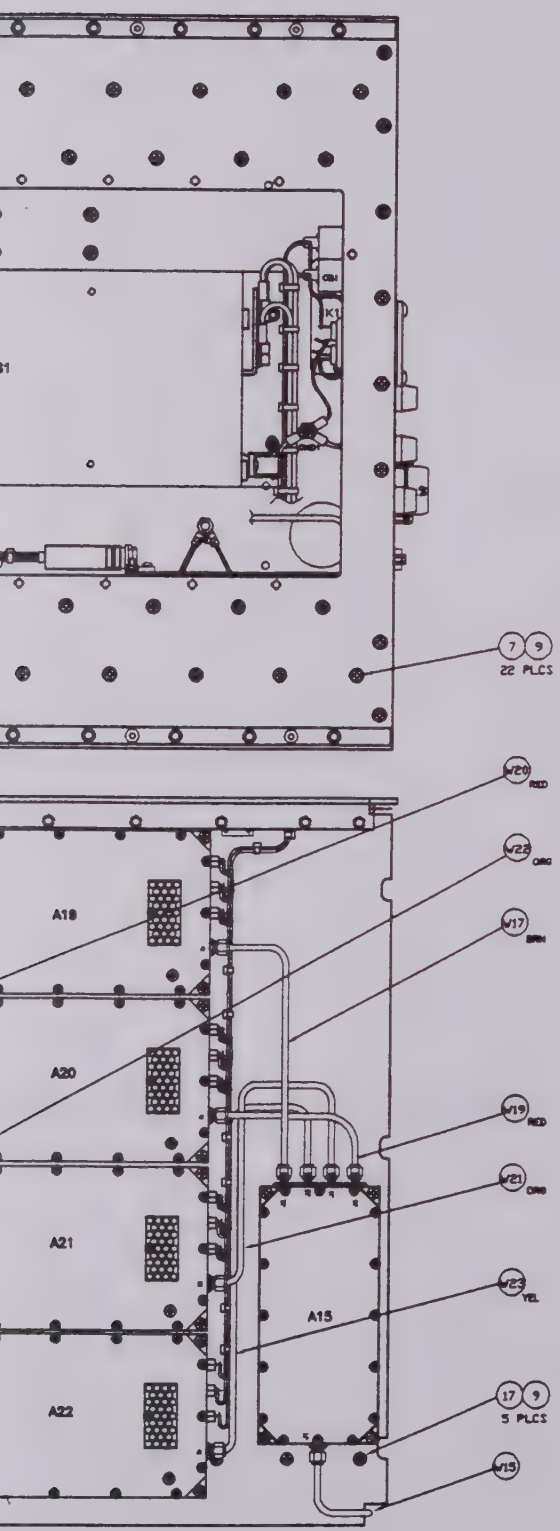
DWG. NO. 1010027

100S1G4 USED ON MODEL	SCALE 1/1	SHEET 1 OF 2	REV. SEE TABLE


J2
A36
A23
A24
A25
A26
W18
W19
W20
W21
W22
W23
W24
W25
W26
W27
W28
W29
W30
W31
W32

REL NO. 1198-03

ECN	DATE	REV
REL	2/04/98	-
102	11/20/98	A



DWG. NO.		
1010027		
SCALE 1/1	SHEET 2 OF 2	REV. SEE TABLE

AMPLIFIER RESEARCH

11:22:03 02 MAY 2001 * * * SINGLE LEVEL BILL OF MATERIAL LISTING * * * REPORT: E0056 PAGE: 1

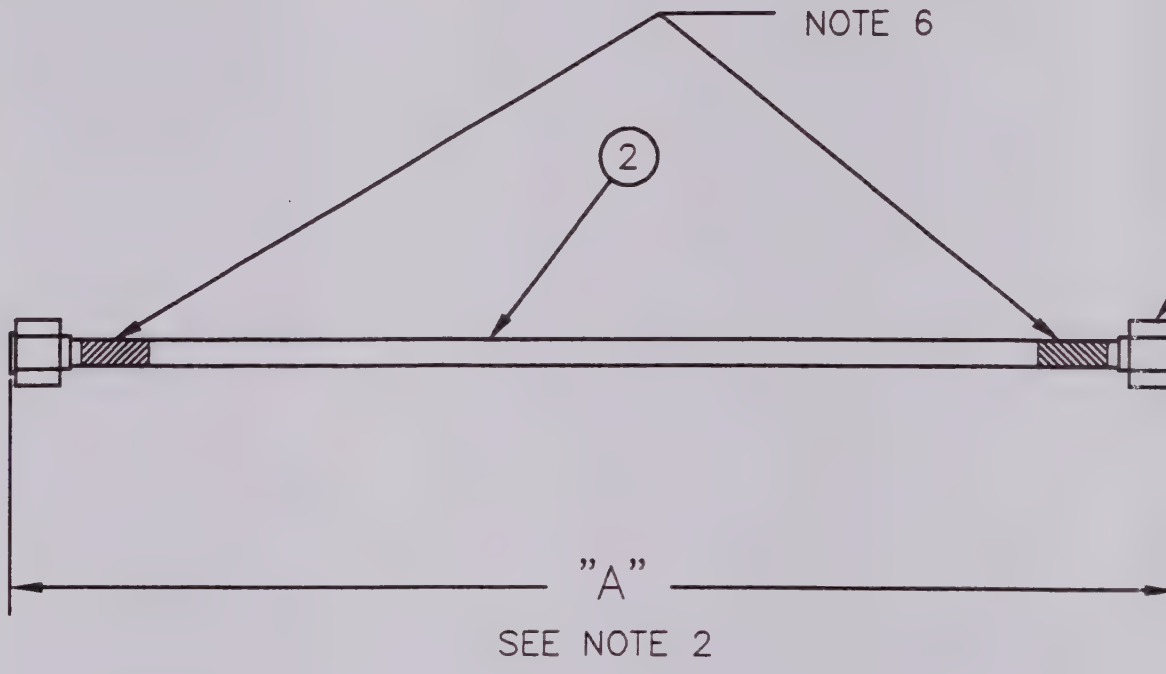
BILL NO: 1010927-501 REV: A U/M: EA DRAWING NO: ARC-D\1010027
RF/PWR SUPPLY ASSY

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1010027	B	ASSY DWG,RF/PWR SUPPLY	EA	REF	ARC-D\1010027	
0100	1010072-501	A	PWB ASSY,4 WAY SPLITTER #3	EA	2.000	ARC-D\1010072	A16 ,A18
0110	1010931-501	-	ASSY,CONTROLLER,120S1G3	EA	1.000		A39U2
0120	1011777-501	-	CABLE KIT,MODEL 100S1G4/120S1G3	EA	1.000		
4200	20568	-	CABLE ASSY,COAX,RG-142B/U,N PNL,SMA,37.5	EA	1.000	ARC-A\1002494	W1
4340	20559	-	CABLE ASSY,COAX,SEMI-RIGID,N,BLKHD,N PLUG,18.0"	EA	1.000	ARC-A\1002494	W50
5000	1009470-501	H	PWR SUPPLY/COMBINER ASSY	EA	1.000	ARC-D\1009470	1
5010	1010929-501	-	HEATSINK ASSY,LS	EA	1.000	ARC-D\1009689	2
5020	1010930-501	-	HEATSINK ASSY,TOP	EA	1.000	ARC-D\1009690	3
5030	1010928-501	-	HEATSINK ASSY,RS	EA	1.000	ARC-D\1009469	4
5050	1010933-501	A	CTRL PNL ASSY	EA	1.000	ARC-D\1009464	5
5060	1009333-301	-	COVER,TOP	EA	1.000	ARC-D\1009333	6
5070	11016		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X .38	EA	66.000	\MS51957-28	7
5080	11014		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X .25	EA	12.000	\MS51957-26	8
5090	12048		WASH,LOCK,SPLIT,S/S,#6	EA	92.000	\MS35338-136	9
5110	1009468-101	A	BRACKET,MTG,SPLITTER	EA	1.000	ARC-C\1009468	11
5120	1010251-101	-	PLATE,MOUNTING	EA	1.000	ARC-C\1010251	12
5130	69111		PLUG,HOLE,METAL,5/8"DIA HOLE,13/16"O/A DIA	EA	2.000	HHS\654	13
5140	11067		SCREW,MACH,FLT HD,100 DEG,CROSS-REC,S/S,6-32X1.00	EA	4.000	\MS24693-C32	14
5150	13004		NUT,HEX,S/S,6-32,.250AF	EA	8.000		15
5160	11023		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X 1	EA	4.000	\MS51957-34	16
5170	11020		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X .50	EA	10.000	\MS51957-30	17

BILL NO: 1011777-501 REV: - U/M: EA DRAWING NO:
CABLE KIT,MODEL 100S1G4/120S1G3

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
4210	20569	A	CABLE ASSY,COAX,SEMI-RIGID,SMA,SMA,15.50"	EA	1.000	ARC-A\1002494	W4
4220	1010026-501	-	CABLE ASSY,(INPUT),COAX,SEMI-RIGID,SMA/SMA	EA	6.000	ARC-B\1010026	W5 ,W6 W9 ,W10 W11 ,W12
4230	1010023-501	-	CABLE ASSY,(INPUT),COAX,SEMI-RIGID	EA	2.000	ARC-B\1010023	W7 ,W8
4240	1010022-501	A	CABLE ASSY,(INPUT),COAX,SEMI-RIGID	EA	4.000	ARC-B\1010022	W13 ,W14 W15 ,W16
4250	1009614-501	-	CABLE ASSY,(INPUT),COAX,SEMI-RIGID	EA	4.000	ARC-B\1009614	W17 ,W25 W33 ,W41
4260	1009615-501	-	CABLE ASSY,(OUTPUT),COAX,SEMI-RIGID	EA	4.000	ARC-B\1009615	W18 ,W26 W34 ,W42
4270	1009614-502	-	CABLE ASSY,(INPUT),COAX,SEMI-RIGID	EA	4.000	ARC-B\1009614	W19 ,W27 W35 ,W43
4280	1009615-502	-	CABLE ASSY,(OUTPUT),COAX,SEMI-RIGID	EA	4.000	ARC-B\1009615	W20 ,W28 W36 ,W44
4290	1009614-503	-	CABLE ASSY,(INPUT),COAX,SEMI-RIGID	EA	4.000	ARC-B\1009614	W21 ,W29 W37 ,W45
4300	1009615-503	-	CABLE ASSY,(OUTPUT),COAX,SEMI-RIGID	EA	4.000	ARC-B\1009615	W22 ,W30 W38 ,W46
4310	1009614-504	-	CABLE ASSY,(INPUT),COAX,SEMI-RIGID	EA	4.000	ARC-B\1009614	W23 ,W31 W39 ,W47
4320	1009615-504	-	CABLE ASSY,(OUTPUT),COAX,SEMI-RIGID	EA	4.000	ARC-B\1009615	W24 ,W32 W40 ,W48

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NOTES:

1.0 REFERENCE LENGTHS MUST BE USED TO SET UP THE "CUT OFF FIXTURE" WHEN CUTTING THE COAX.

2.0 "A" DIM IS CRITICAL WITHIN ±0.010. DIM FROM CENTER PIN TO CENTER PIN.

3.0 CLEAN COAX BEFORE CONNECTOR INSTALLATION.

4.0 USE CONNECTOR INSTALLATION FIXTURE TO INSTALL CONNECTORS.

5.0 DISCARD "O RING".

6.0 APPLY COLOR BAND WITH A PAINT PEN, OR P/N LABEL.

REL NO. 1196-03

ECN	DATE	REV
REL	26MAY99	–



DASH NO.	DIM A	COLOR	REV	FOR BOM SEE
-501	15.00	BROWN	–	1009615-501
-502	13.70	RED	–	1009615-502
-503	12.70	ORANGE	–	1009615-503
-504	12.00	YELLOW	–	1009615-504

QTY. REQD.	ITEM	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015
ANGULAR DIMENSIONS 1/2°		

100S1G4
USED ON MODEL

DRAWN A.REED DATE 6/2/98
CHKD A.REED DATE 26 MAY 99
MECH DATE
ELEC DATE

AMPLIFIER RESEARCH

CABLE (OUTPUT) COAX,SEMI RIGID

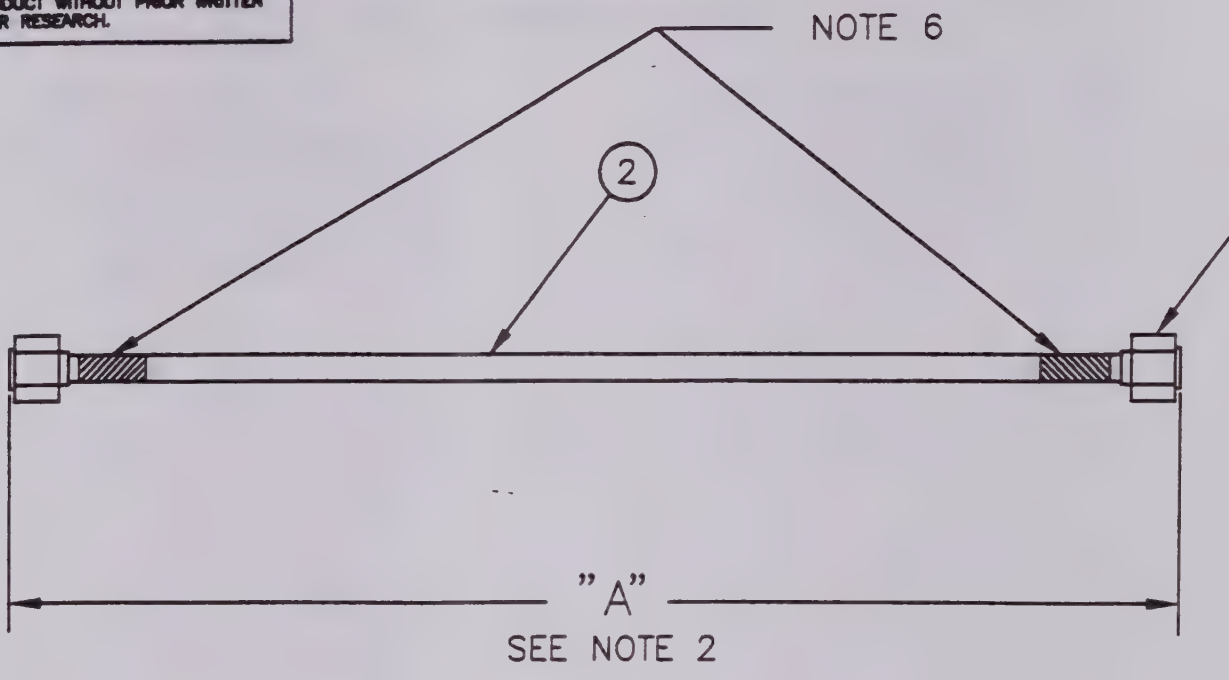
DWG. NO. 1009615

SCALE 1/1 | SHEET 1 OF 1 | REV. —

BILL NO: 1009615-501 REV: - U/M: EA DRAWING NO: ARC-B\1009615
CABLE ASSY,(OUTPUT),COAX,SEMI-RIGID

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1009615	-	ASSY DWG,CABLE,(OUTPUT),COAX,SEMI-RIGID	EA	REF	ARC-B\1009615	
5000	41162		CONN,SMA ST PLUG,SEMI-RIGID COAX	EA	2.000	AEP\9301-7063-009	1
5010	66208	-	WIRE,COAX,SEMI-RIGID,.141 AL-TP/M17 50 OHM	IN	A/R	EZF\810015	2

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NOTES:

1.0 REFERENCE LENGTHS MUST BE USED TO SET UP THE "CUT OFF FIXTURE" WHEN CUTTING THE COAX.

2.0 "A" DIM IS CRITICAL WITHIN ±0.010. DIM FROM CENTER PIN TO CENTER PIN.

3.0 CLEAN COAX BEFORE CONNECTOR INSTALLATION.

4.0 USE CONNECTOR INSTALLATION FIXTURE TO INSTALL CONNECTORS.

5.0 DISCARD "O RING".

6.0 APPLY COLOR BAND WITH A PAINT PEN, OR P/N LABEL.

REL NO. 1196-03

ECN	DATE	REV
REL	26MAY99	–
10288	19NOV99	A

2 PLCS

DASH NO.	DIM A	COLOR	REV	FOR BOM SEE
-501	7.00	BROWN	–	1009614-501
-502	8.30	RED	–	1009614-502
-503	9.30	ORANGE	–	1009614-503
-504	10.00	YELLOW	–	1009614-504

QTY. REQD.	ITEM	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015

ANGULAR DIMENSIONS 1/2°

100S1G4

USED ON MODEL

DRAWN A.REED DATE 6/2/98

CHKD A.REED DATE 26 MAY 99

MECH J.MAGINN DATE 15 JUNE 99

ELEC F.SCHIRK DATE 01 JUNE 99

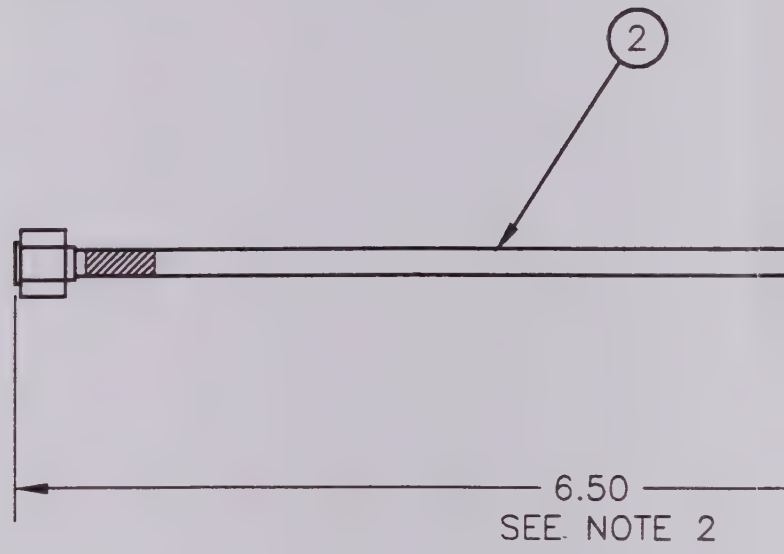
AMPLIFIER RESEARCH

CABLE (INPUT) COAX, SEMI RIGID

DWG. NO. 1009614

SCALE 1/1 | SHEET 1 OF 1 | REV. A

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NOTES:

1.0 REFERENCE LENGTHS MUST BE USED TO SET UP THE "CUT OFF FIXTURE" WHEN CUTTING THE COAX.

2.0 "A" DIM IS CRITICAL WITHIN ±0.010. DIM FROM CENTER PIN TO CENTER PIN.

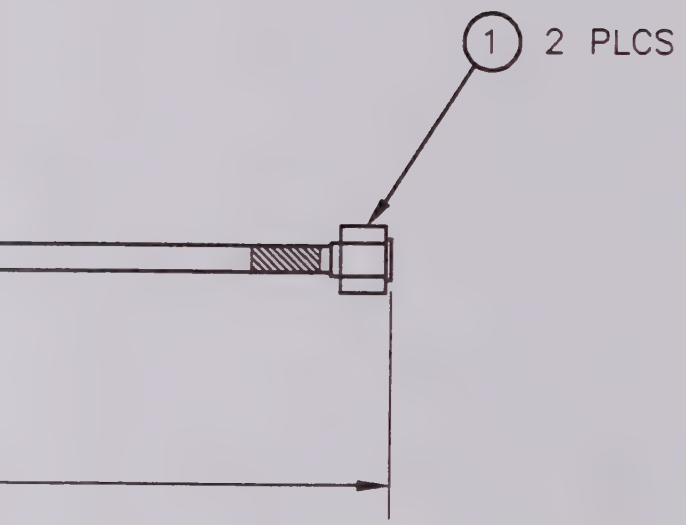
3.0 CLEAN COAX BEFORE CONNECTOR INSTALLATION.

4.0 USE CONNECTOR INSTALLATION FIXTURE TO INSTALL CONNECTORS.

5.0 DISCARD "O RING".

REL NO 1196-03

ECN	DATE	REV
REL	26MAY99	–



ITEM	PART NO.	DESCRIPTION	MARK	FIN	MATL
QTY. REQD.	PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015

ANGULAR DIMENSIONS 1/2°

100S1G4
USED ON MODEL

DRAWN A.REED DATE 6/2/98
CHKD A.REED DATE 03 NOV 98
MECH DATE
ELEC DATE

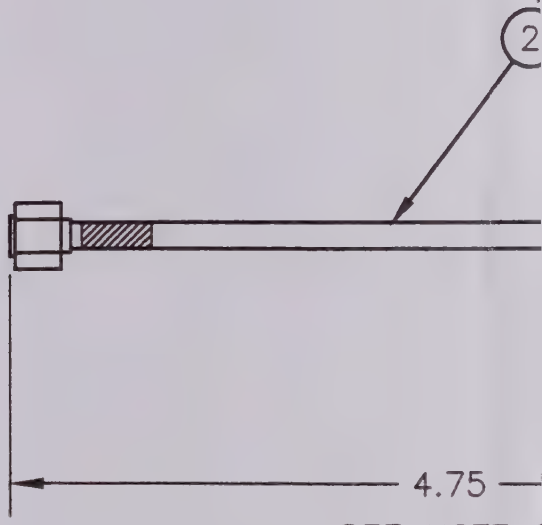
AMPLIFIER RESEARCH

CABLE (INPUT) COAX, SEMI RIGID

DWG. NO. 1010022

SCALE 1/1 | SHEET 1 OF 1 | REV. —

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NOTES:

1.0 REFERENCE LENGTHS MUST BE USED TO SET UP THE "CUT OFF FIXTURE" WHEN CUTTING THE COAX.

2.0 "A" DIM IS CRITICAL WITHIN ±0.010. DIM FROM CENTER PIN TO CENTER PIN.

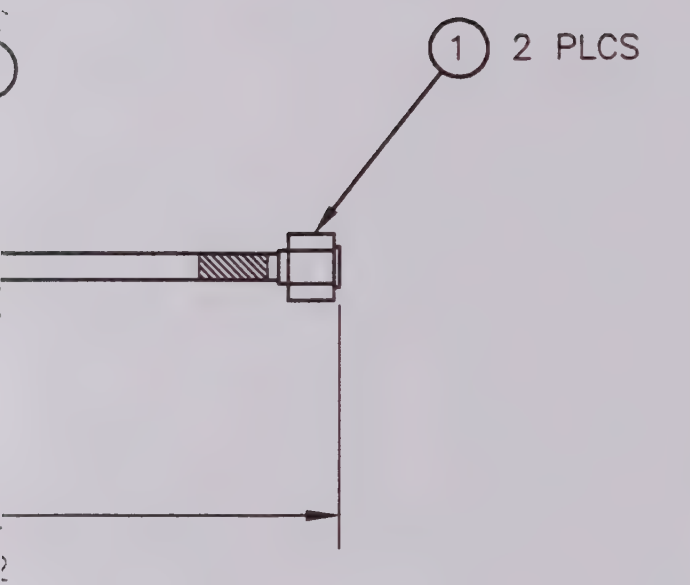
3.0 CLEAN COAX BEFORE CONNECTOR INSTALLATION.

4.0 USE CONNECTOR INSTALLATION FIXTURE TO INSTALL CONNECTORS.

5.0 DISCARD "O RING".

REL NO. 1196-03

ECN	DATE	REV
REL	26MAY99	–



QTY. REQD.	ITEM	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.08	±.015
ANGULAR DIMENSIONS 1/2°		

100S1G4
USED ON MODEL

DRAWN A.REED DATE 6/2/98
CHKD A.REED DATE 03 NOV 98
MECH DATE
ELEC DATE

AMPLIFIER RESEARCH

CABLE (INPUT) COAX, SEMI RIGID

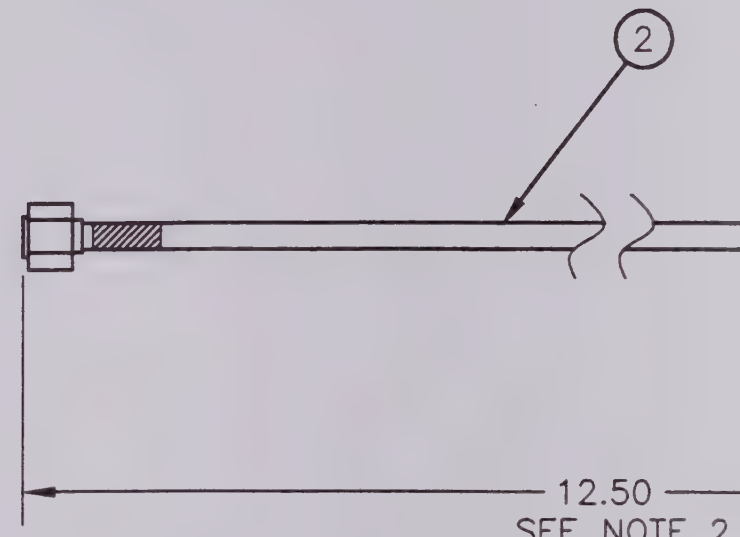
DWG. NO. 1010026

SCALE 1/1 | SHEET 1 OF 1 | REV. —

BILL NO: 1010026-501 REV: - U/M: EA DRAWING NO: ARC-B\1010026
CABLE ASSY,(INPUT),COAX,SEMI-RIGID,SMA/SMA

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1010026	-	ASSY DWG,(INPUT),COAX,SEMI-RIGID,SMA/SMA	EA	REF	ARC-B\1010026	
5000	41140		CONN,SMA PLUG,SEMI-RIGID COAX	EA	2.000	EFJ\142-0693-051	1
5010	66206		WIRE,COAX,SEMI-RIGID,ALUM,50 OHM	EA	4.450	EZF\EZ-86-AL-TP	2

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NOTES:

1.0 REFERENCE LENGTHS MUST BE USED TO SET UP THE "CUT OFF FIXTURE" WHEN CUTTING THE COAX.

2.0 "A" DIM IS CRITICAL WITHIN ±0.010. DIM FROM CENTER PIN TO CENTER PIN.

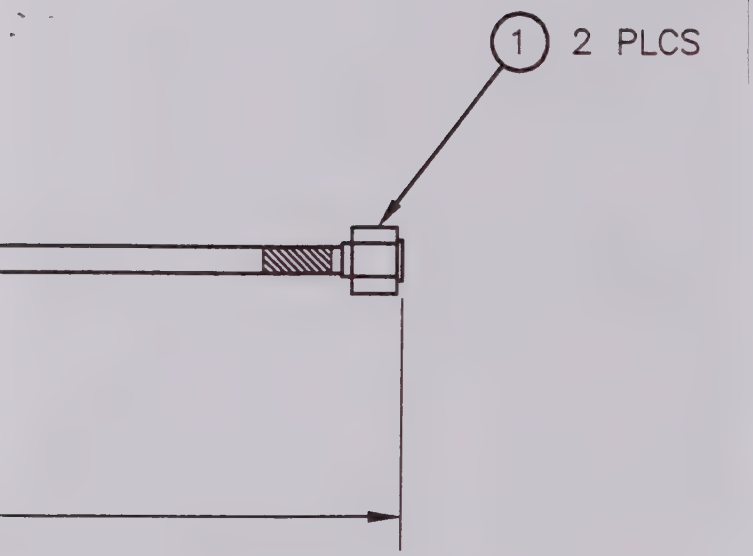
3.0 CLEAN COAX BEFORE CONNECTOR INSTALLATION.

4.0 USE CONNECTOR INSTALLATION FIXTURE TO INSTALL CONNECTORS.

5.0 DISCARD "O RING".

REL NO. 1196-03

ECN	DATE	REV
REL	26MAY99	–



QTY. REQD.	ITEM	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015

ANGULAR DIMENSIONS 1/2°

DRAWN A.REED DATE 6/2/98

CHKD A.REED DATE 03 NOV 98

MECH DATE

ELEC DATE

100S1G4

USED ON MODEL

AMPLIFIER RESEARCH

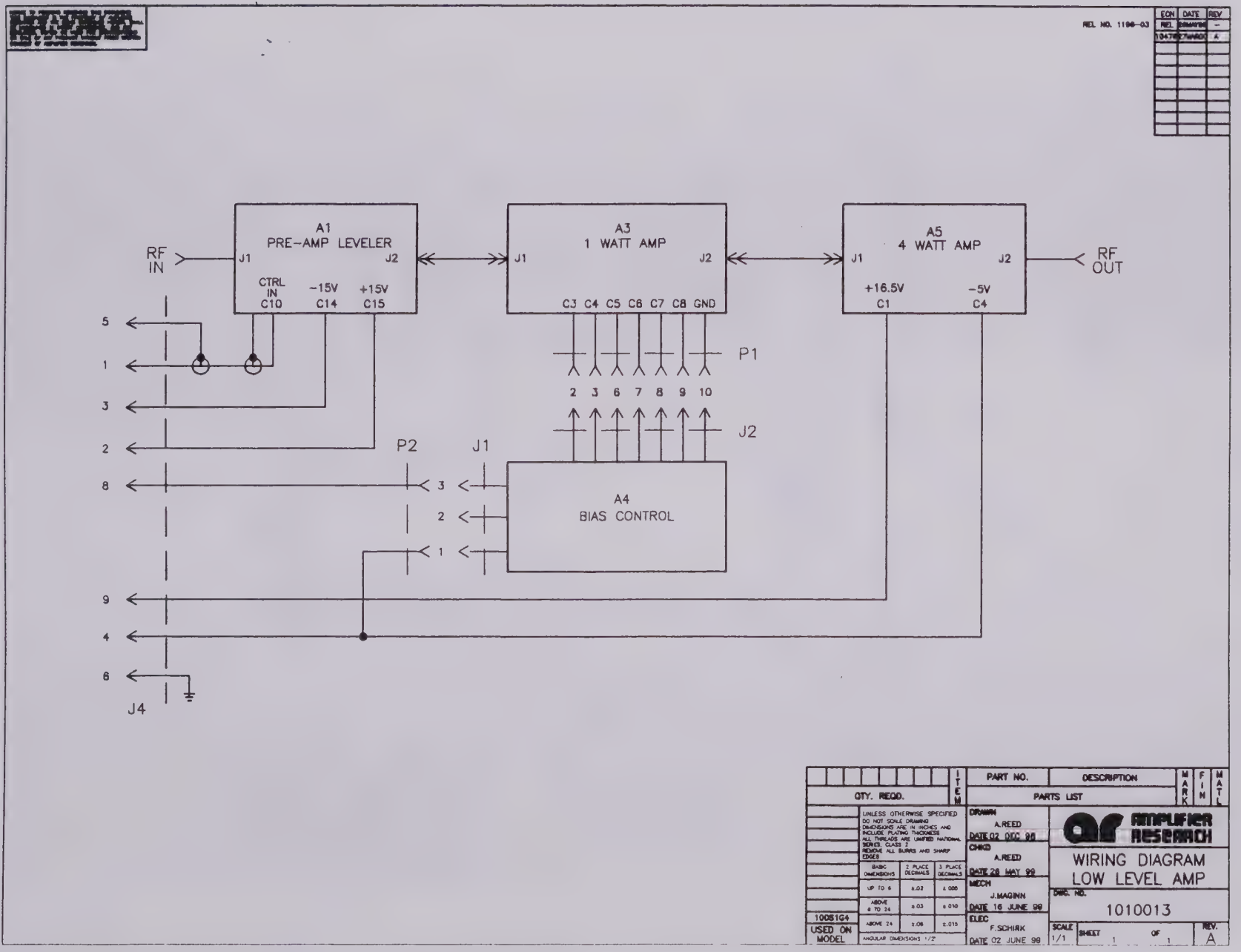
CABLE (INPUT) COAX, SEMI RIGID

DWG. NO. 1010023

SCALE 1/1 | SHEET 1 OF 1 | REV. —

BILL NO: 1010023-501 REV: - U/M: EA DRAWING NO: ARC-B\1010023
CABLE ASSY,(INPUT),COAX,SEMI-RIGID

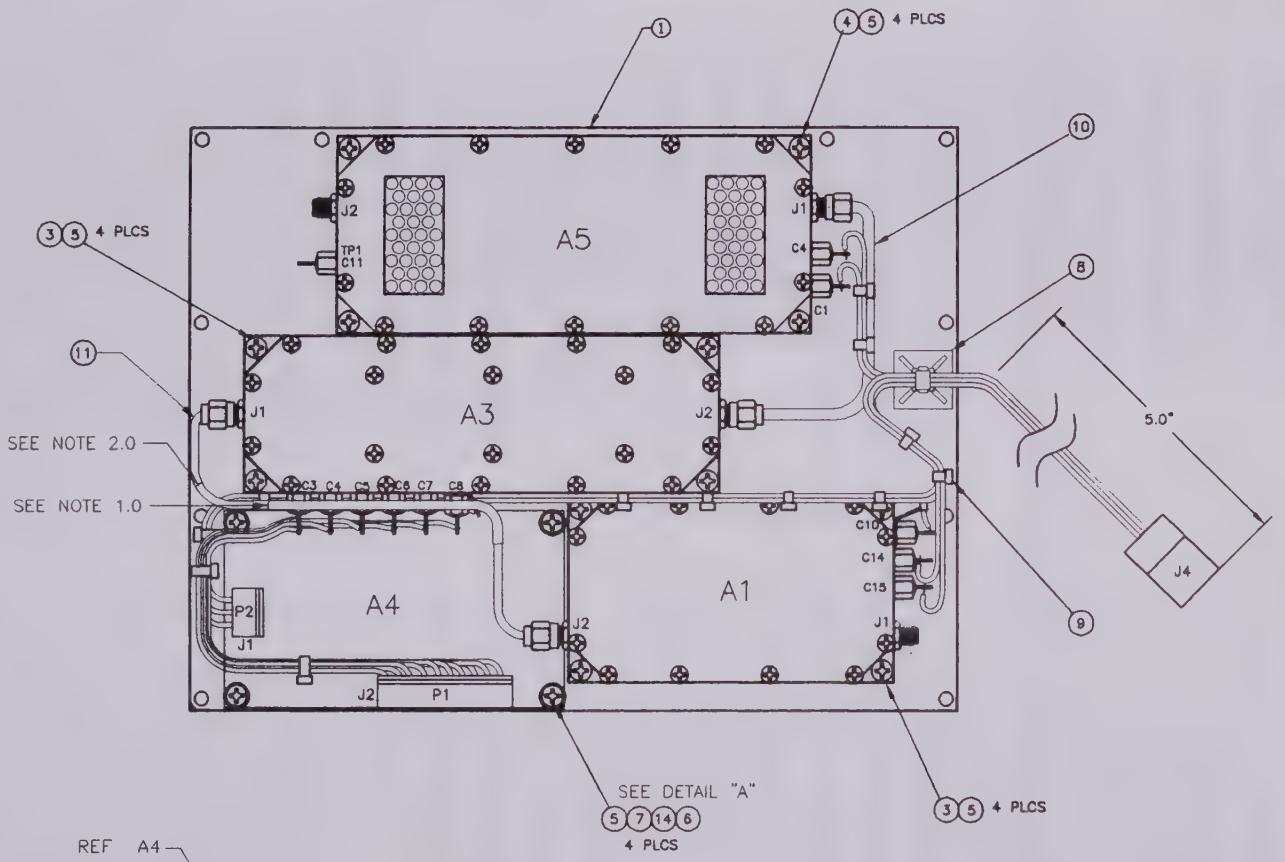
SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1010023	-	ASSY DWG,CABLE (INPUT),COAX,SEMI-RIGID	EA	REF	ARC-B\1010023	
5000	41162		CONN,SMA ST PLUG,SEMI-RIGID COAX	EA	2.000	AEP\9301-7063-009	1
5010	66208	-	WIRE,COAX,SEMI-RIGID,.141 AL-TP/M17 50 OHM	IN	12.500	EZF\810015	2


ECN | DATE | REV
REL NO. 1196-03
A1
PRE-AMP LEVELER
J1
J2
CTRL IN C10
-15V C14
+15V C15
A3
1 WATT AMP
J1
J2
C3 C4 C5 C6 C7 C8 GND
A5
4 WATT AMP
J1
J2
+16.5V C1
-5V C4
RF IN
RF OUT
P1
2 3 6 7 8 9 10
J2
P2
J1
A4
BIAS CONTROL
5
1
3
2
8
9
4
6
J4
ITEM
QTY. REQD.
PART NO.
DESCRIPTION
PARTS LIST
MARK
FIN
MATL
UNLESS OTHERWISE SPECIFIED DO NOT SCALE DRAWING DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2 REMOVE ALL BURRS AND SHARP EDGES
BASIC DIMENSIONS | 2 PLACE DECIMALS | 3 PLACE DECIMALS
UP TO 6 | ±.02 | ±.005
ABOVE 6 TO 24 | ±.03 | ±.010
ABOVE 24 | ±.06 | ±.015
ANGULAR DIMENSIONS 1/2°
DRAWN A.REED DATE 02 DEC 98
CHKD A.REED DATE 28 MAY 99
MECH J.MAGINN DATE 16 JUNE 99
ELEC F.SCHIAK DATE 02 JUNE 99
AMPLIFIER RESEARCH
WIRING DIAGRAM
LOW LEVEL AMP
DWG. NO.
1010013
SCALE 1/1
SHEET 1 OF 1
REV. A
10081G4
USED ON MODEL

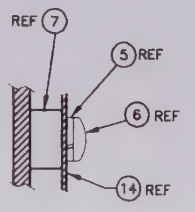
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ECN	DATE	REV
XXXX	3/3/98	1
XXXX	26JUN98	2
XXXX	3NOV98	3
XXXX	3DEC98	4
XXXX	27DEC98	5
XXXX	11MAR99	6
REL	28MAY99	–
10339	07JAN00	A
10478	27MAR00	B

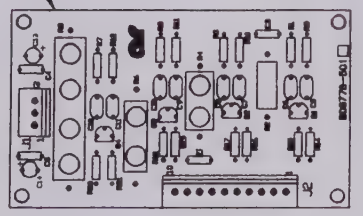
RELEASE NO. 1198-03



DETAIL "A"



REF A4



NOTES:

1.0 SHRINK TUBING TO BE INSTALLED ON SEMI-RIGID COAX CABLE

2.0 RUN COAX AS SHOWN, TO AVOID GOING NEAR R2,R4,R6,R8 ON A4.

FOR BOM SEE: 1009352-501

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED DO NOT SCALE DRAWING DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2 REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	± .02	± .005
ABOVE 6 TO 24	± .03	± .010
ABOVE 24	± .06	± .015

ANGULAR DIMENSIONS 1/2°

DRAWN A.REED DATE 3/3/98
CHKD J.H.REED DATE 28 MAY 99
MECH J.MAGINN DATE 16 JUNE 99
ELEC F.SCHIRK DATE 02 JUNE 99

100S1G4
USED ON MODEL

AMPLIFIER RESEARCH

ASSEMBLY DRAWING
LOW_LEVEL

DWG. NO. 1009352

SCALE 1/1 SHEET 1 OF 1 REV. B

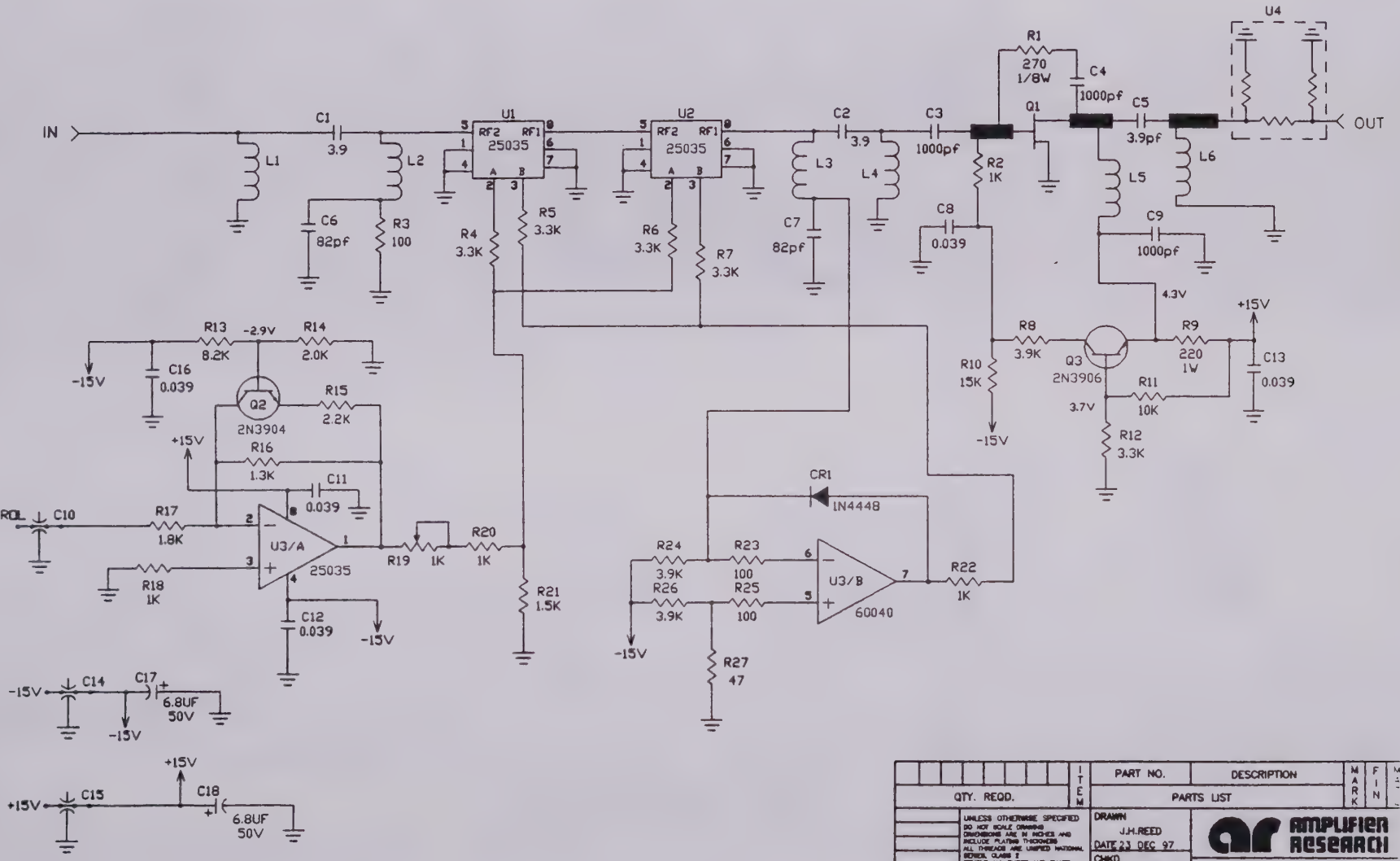
BILL NO: 1009352-501 REV: C U/M: EA DRAWING NO: ARC-C\1009352
ASSY,LO LVL AMP

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1009352	B	ASSY DWG,LOW LEVEL ASSY,100S1G4	EA	REF	ARC-C\1009352	
0020	1010013	A	SCHEM DIAG,LO LVL AMP	EA	REF	ARC-B\1010013	
0100	1009226-501	D	PRE-AMP/ATTENUATOR ASSY	EA	1.000	ARC-C\1009226	A1
0110	1010589-501	C	PWB ASSY,LOW LEVEL "S" MODULE	EA	1.000	ARC-C\1010589	A3
0120	1010748-501	B	PWB ASSY,BIAS CTRL,1W S MODULE	EA	1.000	ARC-C\1010748	A4
0130	1009542-501	B	4 WATT AMP ASSY	EA	1.000	ARC-C\1009542	A5
5000	1009353-101	C	BASE PL,LOW LVL	EA	1.000	ARC-C\1009353	1
5010	11023		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X 1	EA	4.000	\MS51957-34	2
5020	11024		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X 1.25	EA	4.000	\MS51957-35	3
5030	11025		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X 1.50	EA	4.000	\MS51957-36	4
5040	12048		WASH,LOCK,SPLIT,S/S,#6	EA	16.000	\MS35338-136	5
5050	11016		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X .38	EA	4.000	\MS51957-28	6
5060	12024		WASH,FLAT,B/ZN PLTG,.312 OD X .164 ID X .125 THK	EA	4.000	\S785-M01-F21-.164	7
5070	69238	-	BASE,MTG,CABLE TIE,ADH BACK,3/4 X 3/4	EA	3.000	TAB\TC-344A	8
5080	69162		CABLE TIES,7/8 MAX BUNDLE DIA,4 L	EA	A/R	DEN\08432	9
5090	20537	A	CABLE ASSY,COAX,SEMI-RIGID,SMA,SMA,4.5"	EA	1.000	ARC-A\1002494	10
5100	20557	A	CABLE ASSY,COAX,SEMI-RIGID,SMA,SMA,7.25	EA	1.000	ARC-A\1002494	11
5110	1010017-501	A	HARNESS ASSY,LO LEVEL AMP	EA	1.000		12
5120	1008806-501	C	HARNESS ASSY,1 WATT AMP	EA	1.000		13
5130	12011		WASH,FLAT,S/S,#6,.312 OD X .156 ID X .035 THK	EA	4.000	\MS15795-805	14

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ECN	DATE	REV.
XXXX	23DEC97	-
XXXX	11FEB99	-
REL	28MAY99	-

REL NO 1196-03



ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN
		PARTS LIST			

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL, SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.03	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015

ANGULAR TOLERANCES ±2°

DRAWN J.H.REED DATE 23 DEC 97
CHKD J.H.REED DATE 28 MAY 99
MECH DATE
ELEC DATE

AMPLIFIER RESEARCH

SCHEMATIC DIAG.
PRE AMP/ATTN.

DWG. NO. 1009228

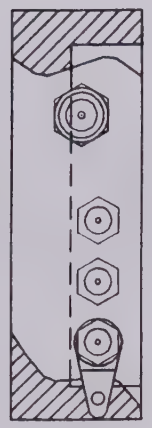
SCALE NONE | SHEET 1 OF 1 | REV —

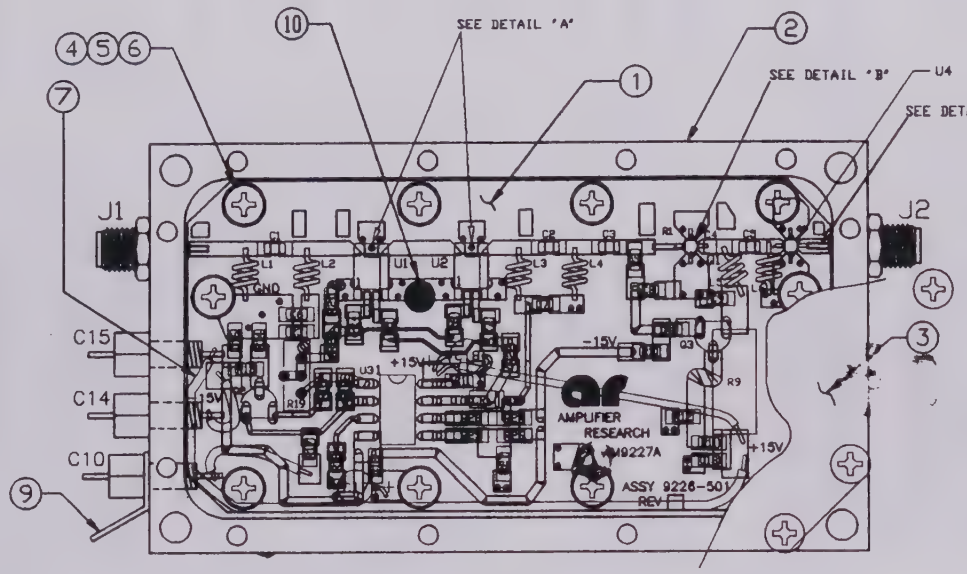
1005IG4
USED ON MODEL

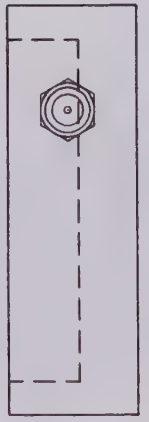
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ECN	DATE	REV
XXXX	05JAN99	1
XXXX	17FEB99	2
REL	23MAY99	–
10210	05OCT99	A
10443	07MAR00	B
10542	12MAY00	C

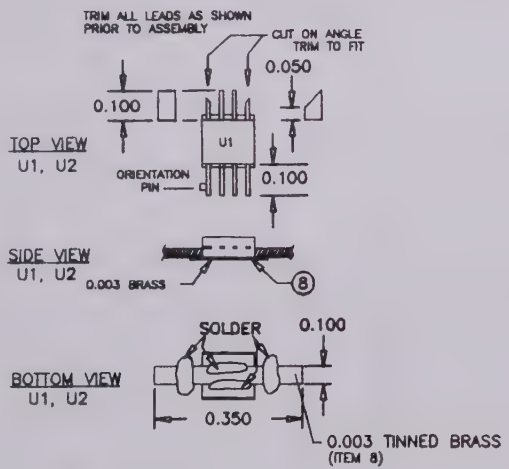
REL NO 1196-03



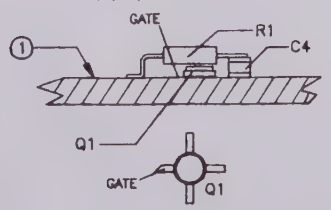


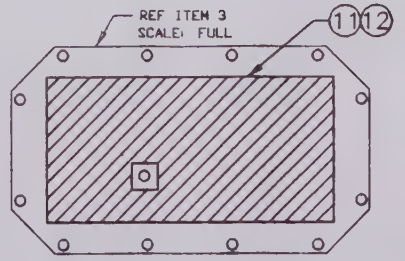


DETAIL "A"

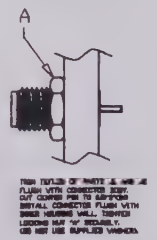


DETAIL "B"





DETAIL "C"



FOR BOM SEE: 1009226-501

ASSEMBLY PROCEDURE
VARIABLE GAIN AMP

1) TRIM LEADS OF U1, AND U2 AS SHOWN IN DETAIL "A".
2) INSTALL U1 AND U2 TO P.C. BOARD. SOLDER 3 MIL. THICK TINNED BRASS FROM BOTTOM OF U1 AND U2 TO GROUND PLANE. U1 AND U2 INSTALLATION MUST BE DONE AT A STATIC APPROVED WORK STATION, SEE DETAIL "A".
3) INSTALL P.C. BOARD INTO HOUSING.
4) INSTALL J1, AND J2, PREPARE ACCORDING TO DETAIL "C".
5) INSTALL FEEDTHRU CAPS C10, C14 AND C15 .
6) INSTALL REMAINING COMPONENTS.
7) INSTALL Q1 PER FET INSTALLATION NOTES.

NOTE: FET INSTALLATION MUST BE DONE AT A STATIC APPROVED WORK STATION. PERSONS MUST BE FAMILIAR WITH THE PROCEDURES. THE FET CAN BE DESTROYED EASILY BOTH ELECTRONICALLY AND MECHANICALLY.

FET INSTALLATION:
1) WITH A GROUNDED SOLDERING IRON, SOLDER Q1 INTO THE CIRCUIT.
2) INSTALL CHIP CAP C4 AS SHOWN IN DETAIL "B".
3) INSTALL RESISTOR R1 AS SHOWN IN DETAIL "B".

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		-101	HOUSING	–	2.1	1.1
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED DO NOT SCALE DRAWING. DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS. ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2 EXCEPT ALL SLITTS AND SHAFT SEALS.

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015
ANGULAR DIMENSIONS 1/2°		

DRAWN J.H.REED DATE 12 JAN 98
CHKD J.H.REED DATE 29 MAY 99
MECH J.MAGINN DATE 16 JUNE 99
ELEC F.SCHIRK DATE 02 JUNE 99

100S1C4
USED ON MODEL

AMPLIFIER RESEARCH

ASSEMBLY
PRE AMP/ATTENUATOR

DWG. NO. 1009226

SCALE 2/1 SHEET 1 OF 1 REV. C

BILL NO: 1009226-501 REV: D U/M: EA DRAWING NO: ARC-C\1009226
PRE-AMP/ATTENUATOR ASSY

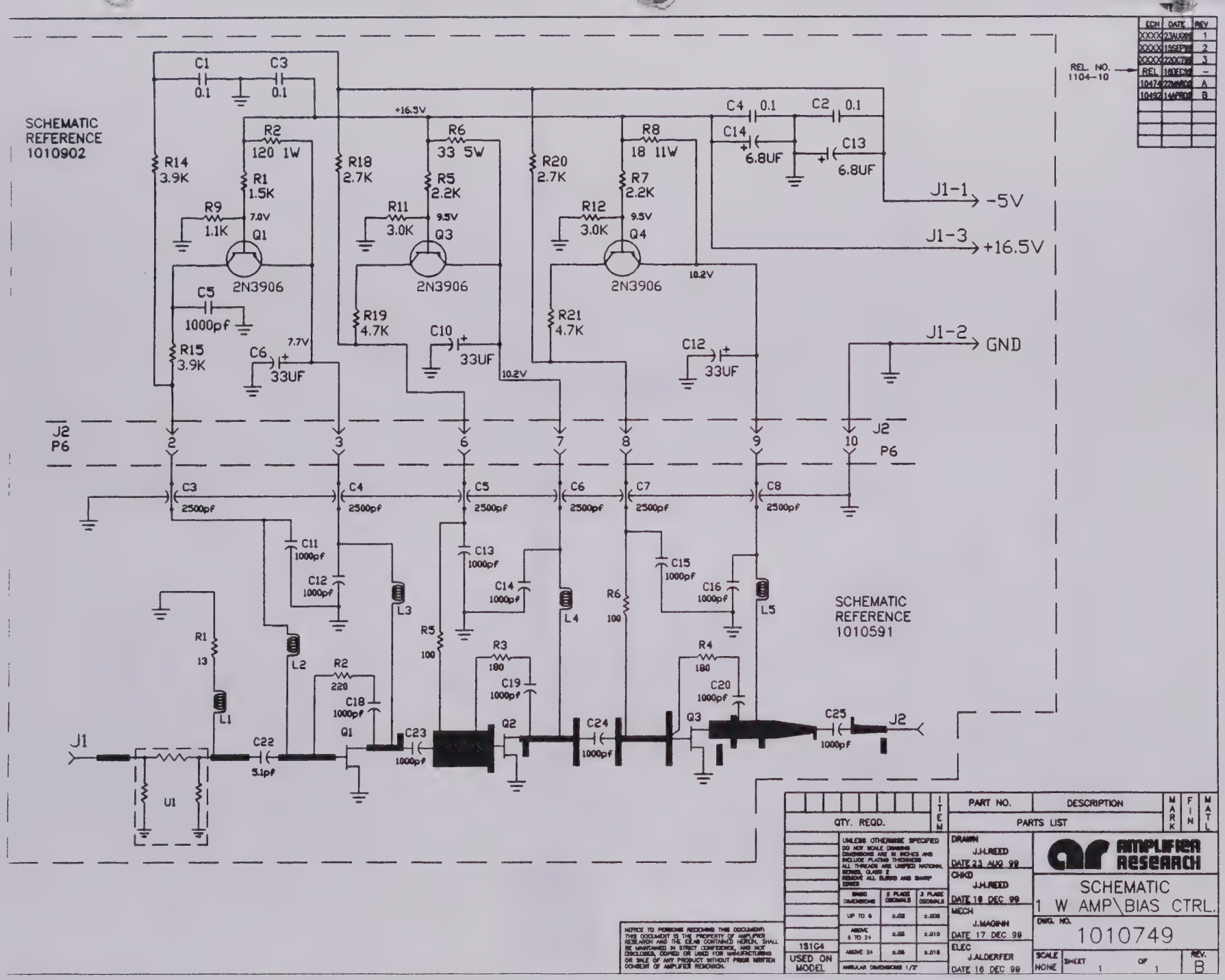
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0010	1009228	-	SCHEM DIAG,PRE-AMP/ATTEN	EA	REF	ARC-C\1009228	
0020	1009226	D	ASSY DWG,PRE-AMP/ATTENUATOR	EA	REF	ARC-C\1009226	
0400	27259		CAPR,CHIP,CER,3.9pF,500V	EA	3.000	ATC\100B3R9CP500X	C1 ,C2 C5
0410	27265		CAPR,CHIP,1000pF,20%,50V	EA	3.000	ATC\100B102MW50X	C3 ,C4 C9
0420	27037		CAPR,CHIP,82pF,10%,500V	EA	2.000	DIL\C17AH820K4TXL	C6 ,C7
0430	27251		CAPR,CHIP,0.039uF,20%,50V	EA	5.000	ATC\200B393MP50	C8 ,C11 C12 ,C13 C16
0440	27098		CAPR,FEED-THRU,FILT,470PF,10%	EA	1.000	MET\FB2B-471GMV	C10
0450	27099		CAPR,FEED-THRU,FILT,2500PF,500V	EA	2.000	MET\51-719-011	C14 ,C15
0460	27055		CAPR,TANT,6.8UF,50V	EA	2.000	MAL\TDC685K050NLF	C17 ,C18
0700	1N4448		DIODE,SIGNAL,75V PIV	EA	1.000	FCH\1N4448	CR1
1500	41243		CONN,COAX,BULKHD JACK,SMA,(F)	EA	2.000	DTA\1321000K82165	J1 ,J2
1800	1007507-101	-	INDUCTOR,AIR WOUND,.050ID,34GA,4T	EA	6.000	ARC-A\1007507	L1 ,L2 L3 ,L4 L5 ,L6
2500	1000034-176	BG	XSTR,RF,LOW NOISE,GaAsFET	EA	1.000	ARC-A\1000034	Q1
2510	2N3904		XSTR,SWNG,NPN,40V,0.2A,1W	EA	1.000		Q2
2520	2N3906		XSTR,SWNG,PNP,40V,0.2A,1W	EA	1.000	ARE\2N3906	Q3
2700	55511-2700J		RES,FXD,CARBON COMP,270,5%,1/8W	EA	1.000	A-B\BB2715	R1
2710	55647-1001J		RES,FXD,CHIP,1K,1/8,5%	EA	4.000	D-K\P1.0K-ECT-ND	R2 ,R18 R20 ,R22
2720	55647-1000J		RES,FXD CHIP,100 OHM,1/8W,5%	EA	3.000	D-K\P100-ECT-ND	R3 ,R23 R25
2730	55647-3301J		RES,FXD,CHIP,3.3K,5%,1/8W	EA	5.000	D-K\P3.3K-ECT-ND	R4 ,R5 R6 ,R7 R12

BILL NO: 1009226-501 REV: D U/M: EA DRAWING NO: ARC-C\1009226
PRE-AMP/ATTENUATOR ASSY

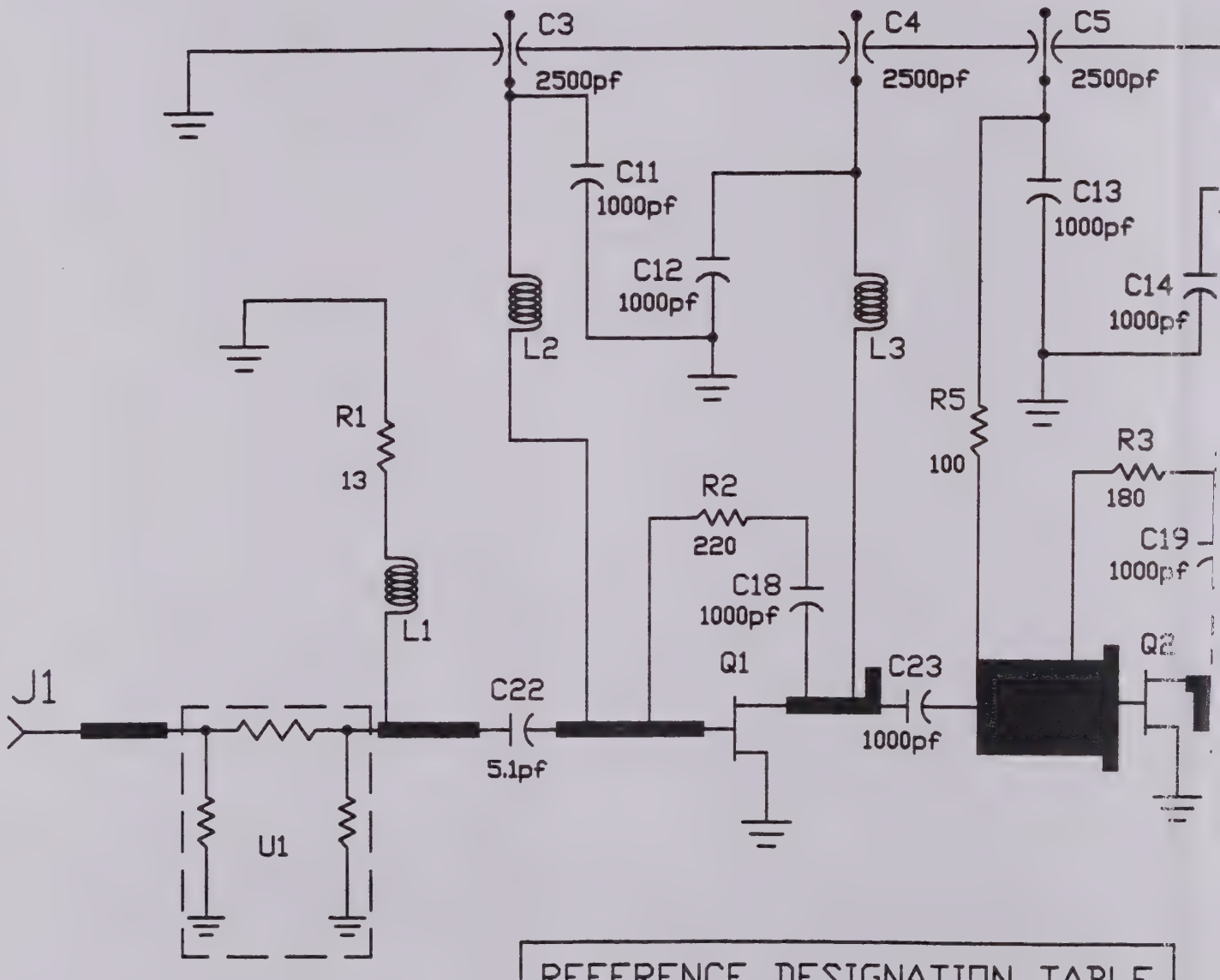
SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
2740	55647-3901J		RES,FXD,CHIP,3.9K,5%,1/8W	EA	3.000	D-K\P3.9K-ECT-ND	R8 ,R24 R26
2750	55514-2200J		RES,FXD,CARBON COMP,220,5%,1W	EA	1.000	A-B\GB2215	R9
2760	55647-1502J		RES,FXD,CHIP,15K,5%,1/8W	EA	1.000	D-K\P15K-ECT-ND	R10
2770	55647-1002J		RES,FXD,10K,5%,1/8W	EA	1.000	D-K\P10K-ECT-ND	R11
2780	55647-8201J		RES,FXD,CHIP,8.2K,5%,1/8W	EA	1.000	D-K\P8.2K-ECT-ND	R13
2790	55647-2001J		RES,FXD,CHIP,2.0K,5%,1/8W,.13L X .06W	EA	1.000	D-K\P2.0K-ECT-ND	R14
2795	55647-2201J		RES,FXD,CHIP,2.2K,5%,1/8W,.13L X .06W	EA	1.000	D-K\P2.2K-ECT-ND	R15
2800	55647-1801J		RES,FXD,CHIP,1.8K,5%,1/8W	EA	1.000	D-K\P1.8K-ECT-ND	R17
2810	55647-1301J		RES,FXD,CHIP,1.3K,5%,1/8W	EA	1.000	D-K\P1.3K-ECT-ND	R16
2820	55917		RES,VAR,CERMET,MULTITURN,TOP ADJ,1K,10%,1W	EA	1.000	MEP\RJ24FW102	R19
2830	55647-1501J		RES,FXD,CHIP,1.5K,5%,1/8W	EA	1.000	D-K\P1.5K-ECT-ND	R21
2840	55647-47R0J		RES,FXD,CHIP,47,5%,1/8W	EA	1.000	D-K\P47ECT	R27
3700	25035		ATTEN,V VAR,DC-5 GHZ	EA	2.000	ANZ\AT-202	U1 ,U2
3710	60040		INTEGRATED CKT,JFET-INPUT OP AMP	EA	1.000	MOT\MC34082P	U3
3720	25056		ATTEN,FXD,10DB	EA	1.000	MIN\PAT-10	U4
5000	1009227-101	B	PWB,PRE-AMP/ATTEN	EA	1.000	ARC-B\1009227	1
5010	1009229-101	A	HSG,PRE-AMP/ATTEN	EA	1.000	ARC-C\1009229	2
5020	1009230-101	A	COVER,PRE-AMP/ATTEN	EA	1.000	ARC-B\1009230	3
5030	11202		SEM,MACH SCREW,PHP W/SPLIT LK WASH,S.S.,4-40x.25	EA	24.000		4
5050	12010		WASH,FLAT,S/S,#4,.250 OD X .125 ID X .022 THK	EA	10.000	\MS15795-803	6
5060	66041		WIRE,TFE,26 AWG,STRANDED,TYPE E,WHT	IN	A/R		7
5070	77144	-	SHIM,BRASS,6.00X.003 THK (ROLL 100")	IN	A/R	MSS\00051037	8
5080	69101		LUG,SOLDER,BENT TONGUE,3/4 L,3/8 OD,1/4 STUD	EA	1.000	HHS\1496	9
5090	14049	-	SPACER,HEX,THD,M-F,A,1/4 HEX,X.625 LG X 4-40	EA	1.000	KEY\8402	10

BILL NO: 1009226-501 REV: D U/M: EA DRAWING NO: ARC-C\1009226
PRE-AMP/ATTENUATOR ASSY

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
5100	69332		FOAM,CONDUCTIVE	IN	A/R	MMM\2802	11
5110	77066		ADH,RTV,SELF-LVL,CLEAR	OZ	A/R	G-E\GE118	12


SCHEMATIC REFERENCE 1010902
C1 0.1
C3 0.1
+16.5V
R2 120 1W
R6 33 5W
R8 18 11W
C4 0.1
C2 0.1
C14 6.8UF
C13 6.8UF
R14 3.9K
R1 1.5K
R18 2.7K
R5 2.2K
R20 2.7K
R7 2.2K
J1-1 -5V
J1-3 +16.5V
R9 1.1K
7.0V
Q1
R11 3.0K
9.5V
Q3
R12 3.0K
9.5V
Q4
2N3906
2N3906
2N3906
10.2V
C5 1000pf
R19 4.7K
R21 4.7K
J1-2 GND
R15 3.9K
7.7V
C6 33UF
C10 33UF
10.2V
C12 33UF
J2 P6
2
3
6
7
8
9
10
J2 P6
C3 2500pf
C4 2500pf
C5 2500pf
C6 2500pf
C7 2500pf
C8 2500pf
C11 1000pf
C12 1000pf
C13 1000pf
C14 1000pf
C15 1000pf
C16 1000pf
L3
L4
L5
R6 100
SCHEMATIC REFERENCE 1010591
R1 13
L2
R2 220
R5 100
R3 180
R4 180
C18 1000pf
C19 1000pf
C20 1000pf
L1
Q1
Q2
Q3
C25 1000pf
J2
J1
C22 3.1pf
C23 1000pf
C24 1000pf
U1
REL. NO. 1104-10
ECN DATE REV
1 2 3 – A B
QTY. REQD.
ITEM
PART NO.
DESCRIPTION
MARK FIN MATL
PARTS LIST
UNLESS OTHERWISE SPECIFIED DO NOT SCALE DRAWING DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2 REMOVE ALL BURRS AND SHARP EDGES
BASIC DIMENSIONS
2 PLACE DECIMALS
3 PLACE DECIMALS
UP TO 6
ABOVE 6 TO 24
ABOVE 24
ANGULAR DIMENSIONS 1/2°
1S1G4
USED ON MODEL
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DRAWN J.H.REED DATE 23 AUG 99
CHKD J.H.REED DATE 19 DEC 99
MECH J.MAGINN DATE 17 DEC 99
ELEC J.ALDERFER DATE 16 DEC 99
AMPLIFIER RESEARCH
SCHEMATIC
1 W AMP\BIAS CTRL.
DWG. NO.
1010749
SCALE NONE
SHEET 1 OF 1
REV. B

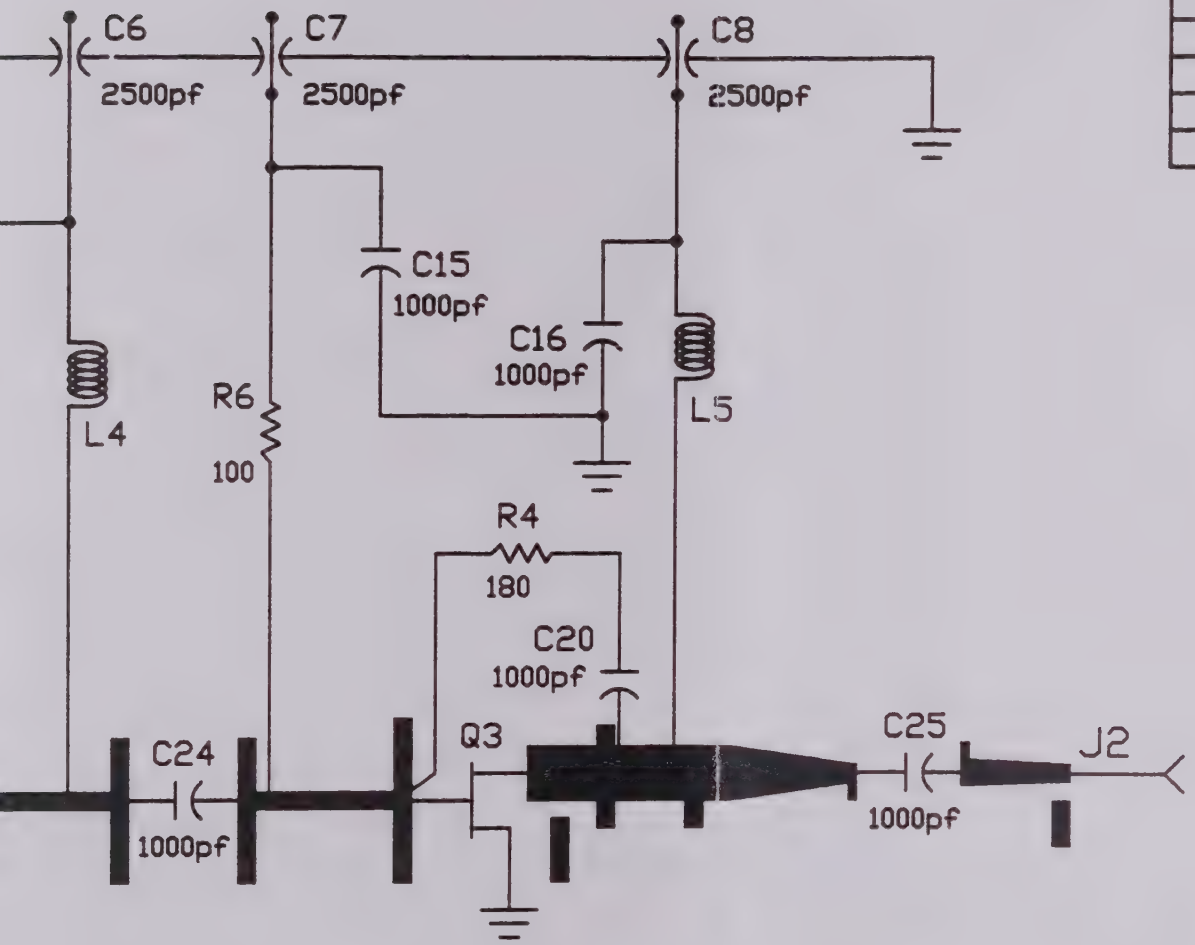
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REFERENCE DESIGNATION TABLE			
LAST DESIGNATION USED			
Q3	C25	L6	R6
DESIGNATIONS NOT USED			
	C1,C2,C9,C10, C17,C21		

ECN	DATE	REV
XXXX	18MAY99	1
XXXX	15SEP99	2
REL	16DEC99	–

REL. NO. 1104-10



QTY. REQD.	ITEM	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.006
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015

ANGULAR DIMENSIONS 1/2°

1S1G4
USED ON MODEL

DRAWN J.H.REED DATE 18 MAY 99
CHKD J.H.REED DATE 16 DEC 99
MECH [signature] DATE 12/17/99
ELEC [signature] DATE 16/DEC/99

AMPLIFIER RESEARCH

SCHEMATIC
LOW LEVEL "S" MODULE

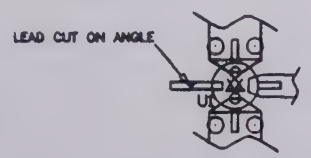
DWG. NO. 1010591

SCALE NONE | SHEET 1 OF 1 | REV. —

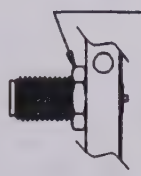
ECN	DATE	REV
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–	03DEC99	2
REL	19JAN00	–
10492	14APR00	A

REL. NO. 1113-09

DETAIL "A"

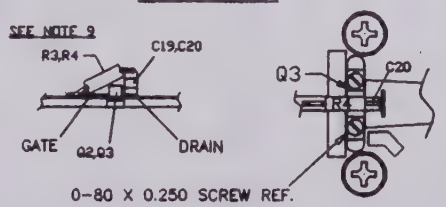


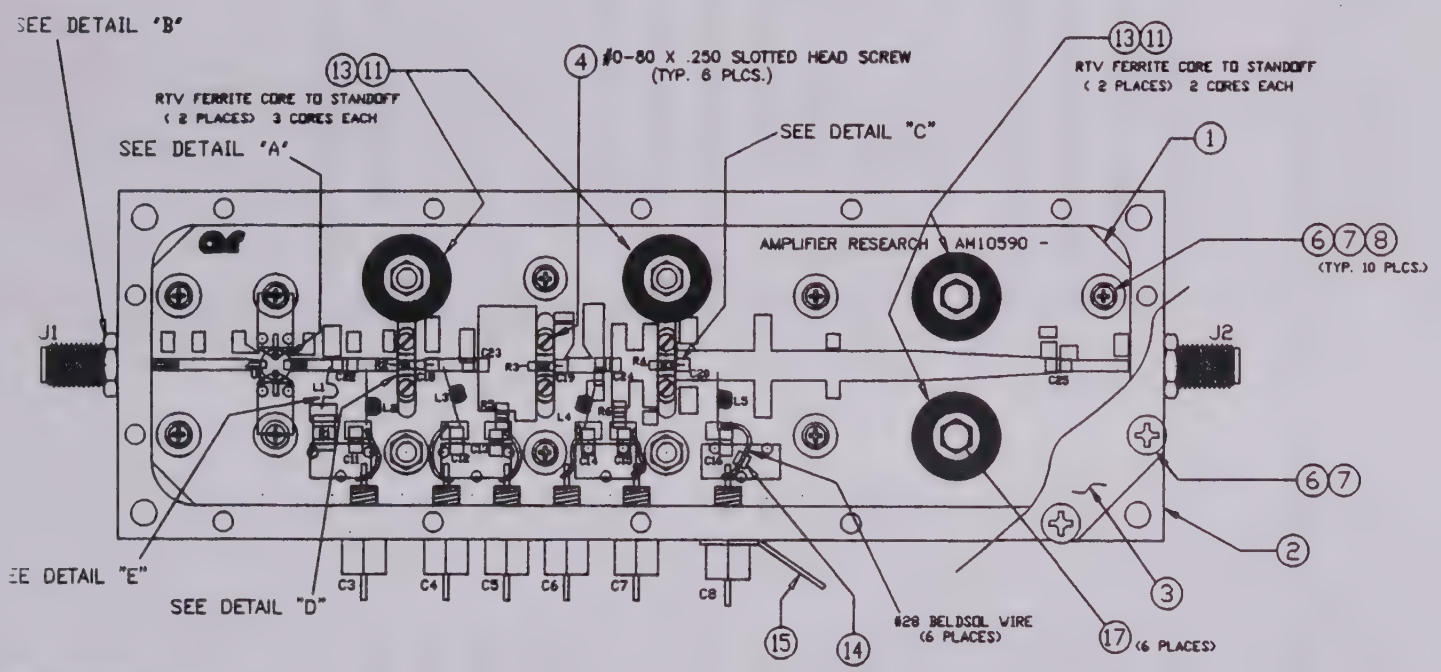
DETAIL "B"



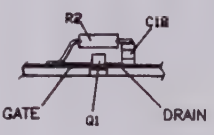
TRIM TEFLON OF PARTS J1 & J2 FLUSH WITH CONNECTOR BODY. CUT CENTER PIN TO 0.075"(IN) INSTALL CONNECTOR FLUSH WITH INNER HOUSING WALL. TIGHTEN LOCKING NUT "A" SECURELY. (DO NOT USE SUPPLIED WASHER)

DETAIL "C"





DETAIL "D"



DETAIL "E"



EMBLY PROCEDURE
ATT AMP

1) INSTALL P.C. BOARD INTO HOUSING - CENTER MOUNTING SCREW HOLES IN SLOTS FOR Q1, Q2 AND Q3.
2) TEMPORARILY USE MOUNTING HARDWARE TO HOLD BOARD IN PLACE PRIOR TO INSTALLING STANDOFFS, ITEM 17 AT COMPLETION.
3) INSTALL CONNECTOR J1 AND J2 INTO HOUSING.
NOTE: SEE DETAIL "B".
4) INSTALL FEEDTHRU C3 THRU C8 INTO HOUSING.
5) INSTALL R1, R5, R6 (WITH FACE VALUE DOWN).
6) INSTALL ALL OF THE CERAMIC CHIP CAPS EXCEPT C18, C19, AND C20.
7) INSTALL L1 THRU L5.
8) INSTALL #28 BELDSOL JUMPER WIRES BETWEEN FEEDTHRU AND P.C. BOARD.
9) THE FOLLOWING FET INSTALLATION MUST BE DONE AT A STATIC APPROVED WORK STATION. PERSONS HANDLING AND INSTALLING THE FET'S MUST BE FAMILIAR WITH THE PROCEDURE THE FET CAN BE DESTROYED BOTH ELECTRICALLY AND MECHANICALLY.

9) FET INSTALLATION(GATE LEADS OF Q1-Q3 MUST FACE TOWARD J1).
NOTE: STEPS 1 THRU 6 ABOVE MUST BE COMPLETED BEFORE INSTALLING FETS.
(a) CUT THE GATE LEAD TO APPROXIMATELY .075" LONG - THE GATE LEAD MUST BE CUT AT AN ANGLE TO MAINTAIN LEAD IDENTIFICATION.
(b) CUT THE DRAIN LEAD TO APPROX. .075 LONG.
(c) INSTALL 0-80 SCREWS TO HOLD Q1-Q3 CIRCUIT.
10) INSTALL FEEDBACK CAPACITORS C18, C19, AND C20 .
11) INSTALL FEEDBACK RESISTOR R2 AT Q1 PER DETAIL "D".
12) INSTALL FEEDBACK RESISTORS R3 AND R4 TO Q2 AND Q3 PER DETAIL "C".

FOR BOM, SEE 1010589-501

ITEM QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
	PARTS LIST				

UNLESS OTHERWISE SPECIFIED DO NOT SCALE DRAWING. DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS. ALL THREADS ARE UNIFIED NATIONAL STANDARD, CLASS 2. REMOVE ALL BURRS AND SHARP EDGES.

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.03	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015

ANGULAR DIMENSIONS 1/2°

DRAWN	J.H.REED DATE 19 SEPT 99
CHKD	J.H.REED DATE 19 JAN 00
MECH	J.MAGINN DATE 27 JAN 00
ELEC	J.ALDERFER DATE 27 JAN 00

AMPLIFIER RESEARCH

ASSEMBLY
PWB, 1 WATT AMP

DWG. NO. 1010589

USED ON MODEL	SCALE	SHEET	OF	REV.
1051G4	2/1	1	1	A

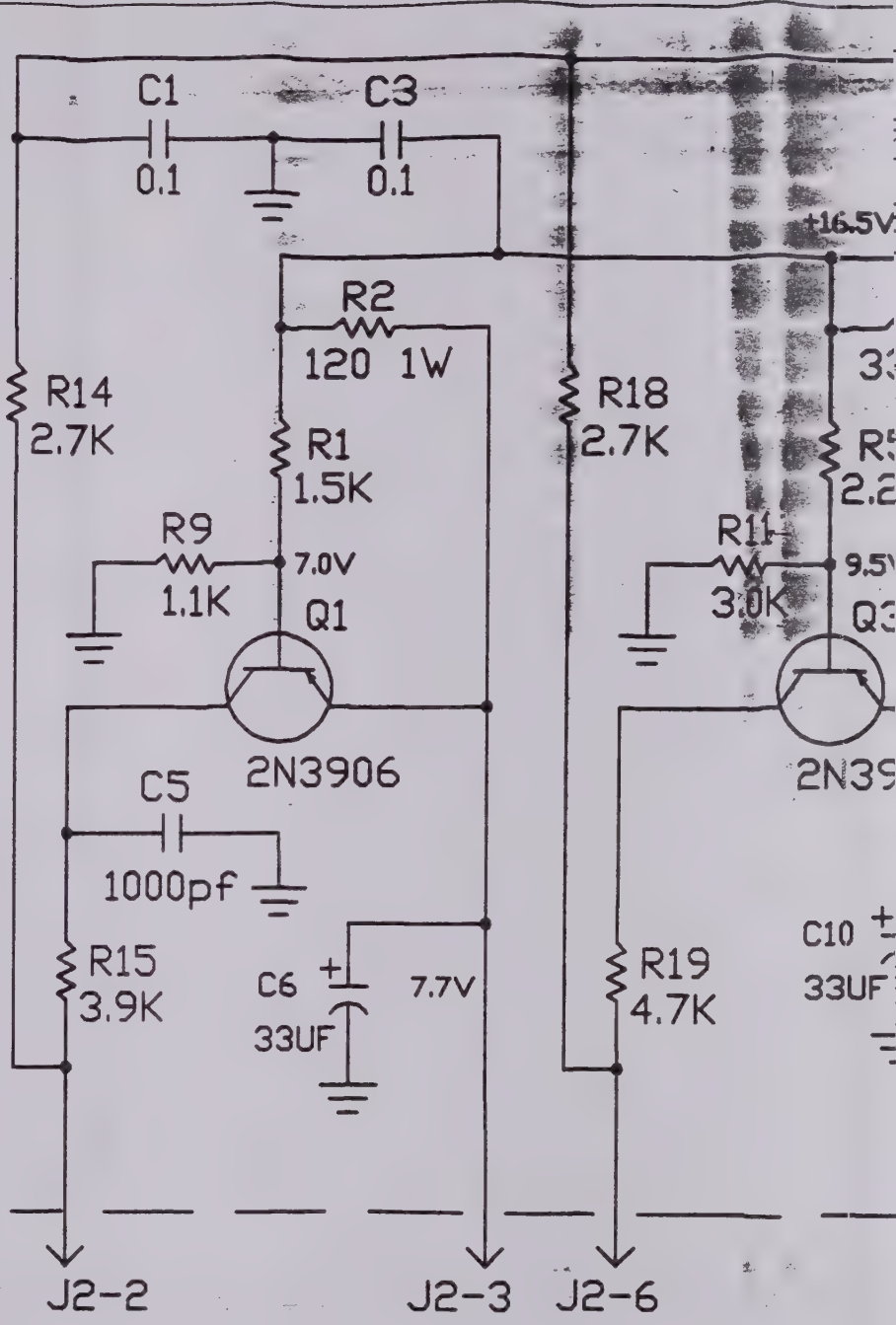
BILL NO: 1010589-501 REV: C U/M: EA DRAWING NO: ARC-C\1010589
PWB ASSY,LOW LEVEL "S" MODULE

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1010591	A	SCHEM DIAG,LOW LEVEL "S" MODULE	EA	REF	ARC-B\1010591	
0020	1010589	D	ASSY DWG,LOW LEVEL "S" MODULE	EA	REF	ARC-C\1010589	
0400	27099		CAPR,FEED-THRU,FILT,2500PF,500V	EA	6.000	MET\51-719-011	C3 ,C4 C5 ,C6 C7 ,C8
0410	27039		CAPR,CHIP,CER,1000pF,10%,50V	EA	12.000	ATC\700B102MCA50X	C11 ,C12 C13 ,C14 C15 ,C16 C18 ,C19 C20 ,C23 C24 ,C25
0420	27024		CAPR,CHIP,5.1pF,0.5%,500V	EA	1.000	DIL\C17AH5R1D500NT	C22
1500	41243		CONN,COAX,BULKHD JACK,SMA,(F)	EA	2.000	DTA\1321000K82165	J1 ,J2
1800	66052		WIRE,MAGNET,SOLDERABLE,28 AWG,GRN	EA	2.000		L1 ,L2
1810	1007507-102	-	INDUCTOR,AIR WOUND,.050ID,34GA,5T	EA	3.000	ARC-A\1007507	L3 ,L4 L5
2500	1000034-183	BJ	XSTR,RF,LOW NOISE,GaAsFET	EA	1.000	ARC-A\1000034	Q1
2510	1000034-184	BJ	XSTR,RF,MED PWR,GaAsFET	EA	1.000	ARC-A\1000034	Q2
2520	1000034-185	BJ	XSTR,RF,MED PWR,GaAsFET	EA	1.000	ARC-A\1000034	Q3
2700	55649-13R0J		RES,FXD,CHIP,13,5%,1W	EA	1.000	D-K\P13XCT-ND	R1
2710	55511-2200J		RES,FXD,CARBON COMP,220,5%,1/8W	EA	1.000	A-B\BB2215	R2
2720	55511-1800J		RES,FXD,CARBON COMP,180,5%,1/8W	EA	2.000	A-B\BB1815	R3 ,R4
2730	55647-1000J		RES,FXD CHIP,100 OHM,1/8W,5%	EA	2.000	D-K\P100-ECT-ND	R5 ,R6
2740	55647-1001J		RES,FXD,CHIP,1K,1/8,5%	EA	1.000	D-K\P1.0K-ECT-ND	R7
3700	25069		ATTEN,FXD,2dB,1W,70 MIL PKG	EA	1.000	MIN\PAT-2	U1
5000	1011767-101	1	PWB,1 WATT AMP	EA	1.000	ARC-B\1011767	1
5010	1010548-101	-	HSG,LOW LEVEL "S" MODULE	EA	1.000	ARC-D\1010548	2
5020	1010757-101	-	COVER,LOW LEVEL 1W AMP,S MODULE	EA	1.000	ARC-B\1010757	3

BILL NO: 1010589-501 REV: C U/M: EA DRAWING NO: ARC-C\1010589
PWB ASSY,LOW LEVEL "S" MODULE

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
5030	11145		SCREW,MACH,FIL HD,SLOTTED,0-80 X .25	EA	6.000		4
5050	11010		SCREW,MACH,PAN HD,CROSS-REC,S/S,4-40 X .25	EA	24.000	\MS51957-13	6
5060	12047		WASH,LOCK,SPLIT,S/S,#4	EA	24.000	\MS35338-135	7
5070	12010		WASH,FLAT,S/S,#4,.250 OD X .125 ID X .022 THK	EA	10.000	\MS15795-803	8
5090	66054		WIRE,MAGNET,SOLDERABLE,28 AWG,RED	IN	A/R		10
5100	1000643-612	C	CORE,FERRITE,TOROID,3E2A	EA	10.000	ARC\1000643	11
5120	77066		ADH,RTV,SELF-LVL,CLEAR	EA	A/R	G-E\GE118	13
5130	1000643-401	C	CORE,FERRITE,BEAD	EA	1.000	ARC\1000643	14
5140	69101		LUG,SOLDER,BENT TONGUE,3/4 L,3/8 OD,1/4 STUD	EA	1.000	HHS\1496	15
5160	69429		SPACER,RND,M-F,A,1/4 OD x .625 L x 4-40	EA	6.000	RAF\4036-440-A	17
5170	1011381-101	-	SPACER,PWB	EA	3.000	ARC-B\1011381	18

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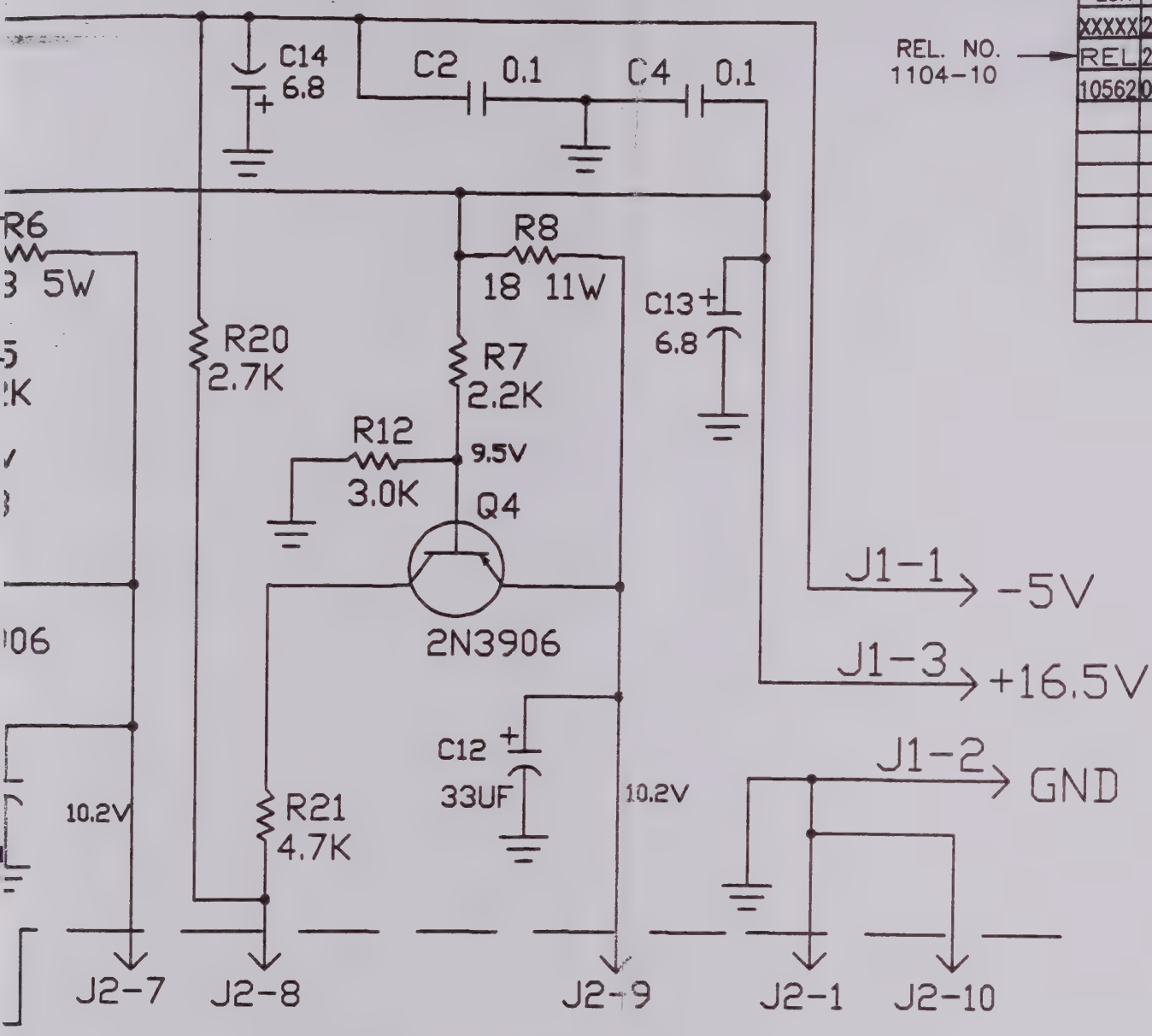


NOTES:

1.0 UNLESS OTHERWISE INDICATED, ALL RESISTORS ARE IN OHMS, 1/4 WATT, AND 5% TOLERANCE.

2.0 ALL CAPACITORS ARE IN MICROFARADS, AND ARE 50 VOLTS,UNLESS INDICATED.

REFERENCE DESIGNATION T		
LAST DESIGNATION USE		
C14	Q4	R21
DESIGNATIONS NOT USE		
C7,8,9,11	Q2	R3,4,10,13



ECN	DATE	REV
XXXXX	25OCT99	1
REL	25OCT99	–
10562	08JUN00	A

REL. NO. 1104-10

QTY. REQD.	ITEM	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

ABLE
D
D
3,16,17

1S1G4
USED ON MODEL

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015

ANGULAR DIMENSIONS 1/2°

DRAWN J.H.REED DATE 25 OCT 99
CHKD J.H.REED DATE 16 DEC 99
MECH J.MAGINN DATE 17 DEC 99
ELEC J.ALDERFER DATE 16 DEC 99

AMPLIFIER RESEARCH

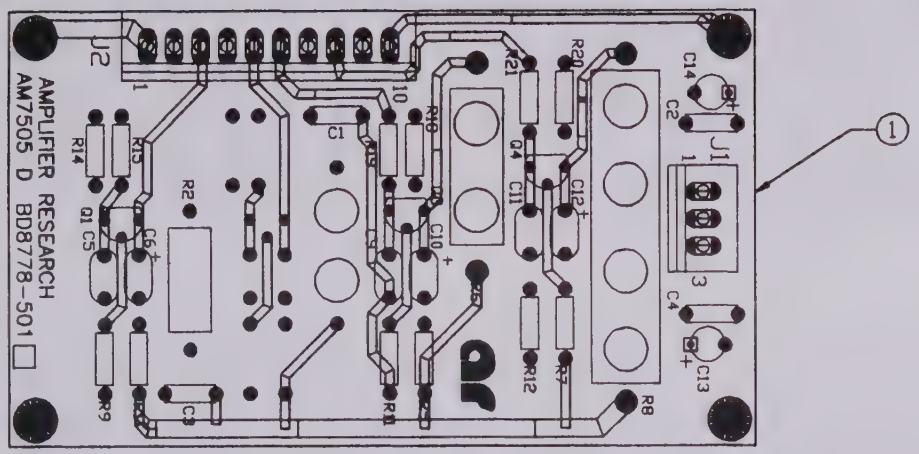
SCHEMATIC BIAS CONTROL

DWG. NO. 1010902

SCALE NONE | SHEET 1 OF 1 | REV. A

ECN	REV
XXXXX	10CT98	1
REL	DEC98	-
XXXXX	XXXXX	A

REL. NO. 1104-10



FOR BOM, SEE 1010748-501

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND TOLERANCE PLACE DECIMALS
ALL THREADS ARE UNIFIED NATIONAL COARSE CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.05	±.010
ABOVE 24	±.05	±.010

ANGULAR DIMENSIONS ±2°

DRAWN J.H.REED DATE 21 OCT 98
CHKD J.H.REED DATE 16 DEC 99
MECH J.MAGINN DATE 02 DEC 99
ELEC J.ALDERFER DATE 16 DEC 99

AMPLIFIER RESEARCH

PWB,ASSY
BIAS CONTROL BD.

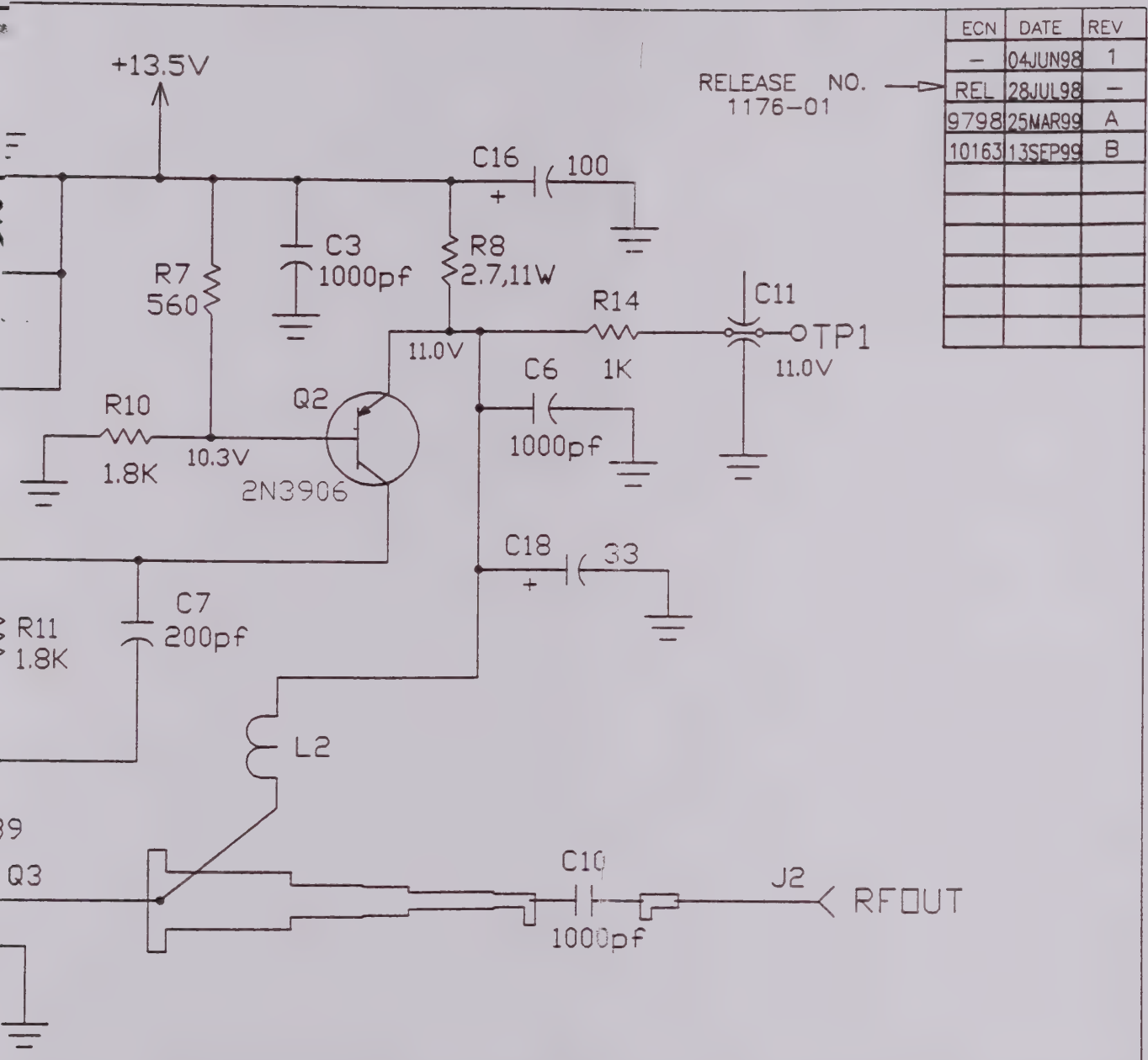
DWG. NO. 1010748

SCALE NONE | SHEET 1 OF 1 | REV. A

131G4
USED ON MODEL

BILL NO: 1010748-501 REV: B U/M: EA DRAWING NO: ARC-C\1010748
PWB ASSY,BIAS CTRL,1W S MODULE

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1010748	A	ASSY DWG,BIAS CTRL,1W S MODULE	EA	REF	ARC-C\1010748	
0020	1010749	B	SCHEM DIAG,BIAS CTRL	EA	REF	ARC-C\1010749	
0400	27236		CAPR,FXD,DIP SPACED CER,.1UF,50VDC	EA	4.000	AVX\MD015C104MAA	C1 ,C2 C3 ,C4
0410	27179		CAPR,CER,1000pF,1000V,10%,CHAR Z5F	EA	3.000	NIC\NCD102K1KVY5F	C5 ,C9 C11
0420	27051		CAPR,TANT,33UF,35VDC,EPOXY	EA	3.000	AVX\TAP336K035HSB	C6 ,C10 C12
0430	27055		CAPR,TANT,6.8UF,50V	EA	2.000	MAL\TDC685K050NLF	C13 ,C14
1500	41082		CONN,STR,3 PIN	EA	1.000	PNT\MLSS156-3	J1
1510	41084		CONN,LOCKING HEADER,STR,10 PIN,SQR POSTS	EA	1.000	PNT\MLSS156-10-L	J2
2500	2N3906		XSTR,SWNG,PNP,40V,0.2A,1W	EA	3.000	ARE\2N3906	Q1 ,Q3 Q4
2700	55612-1501J		RES,FXD,METAL FILM,1.5K,5%,1/4-1/2W	EA	1.000	TRW\GP55-1501+/-5%	R1
2730	55514-1200J		RES,FXD,CARBON COMP,120,5%,1W	EA	1.000	A-B\GB1215	R2
2740	55612-2201J		RES,FXD,METAL FILM,2.2K,5%,1/4-1/2W	EA	2.000	TRW\GP55-2201+/-5%	R5 ,R7
2750	55515-33R0J		RES,FXD,CARBON COMP,33,5%,2W	EA	1.000	A-B\HB3305	R6
2760	55724-18R0J		RES,FXD,WW,18,5%,11W	EA	1.000	OHM\90J18R	R8
2770	55612-1101J		RES,FXD,METAL FILM,1.1K,5%,1/4-1/2W	EA	1.000	TRW\GP55-1101+/-5%	R9
2780	55612-3001F		RES,FXD,PRECISION,3K,1%,1/4W,CHAR.D	EA	2.000	IRC\RN55D3001F	R11 ,R12
2800	55612-3901J		RES,FXD,METAL FILM,3.9K,5%,1/4-1/2W	EA	2.000	TRW\GP55-3901+/-5%	R14 ,R15
2810	55612-2701J		RES,FXD,METAL FILM,2.7K,5%,1/4-1/2W	EA	2.000	TRW\GP55-2701+/-5%	R18 ,R20
2820	55612-4701J		RES,FXD,METAL FILM,4.7K,5%,1/4-1/2W	EA	2.000	TRW\GP55-4701+/-5%	R19 ,R21
5000	1007505-101	D	PWB,BIAS CTRL,1 WATT AMP	EA	1.000	ARC-B\1007505	1



ECN	DATE	REV
–	04JUN98	1
REL	28JUL98	–
9798	25MAR99	A
10163	13SEP99	B

RELEASE NO. 1176-01

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015
ANGULAR DIMENSIONS ±2°		

25S1G4A
USED ON MODEL

DRAWN J.H.REED DATE 27 JUNE 96
CHKD J.H.REED DATE 28 JULY 98
MECH J.MAGINN DATE 30 JULY 98
ELEC F.SCHIRK DATE 28 JULY 98

AMPLIFIER RESEARCH

SCHEMATIC 4 WATT AMP

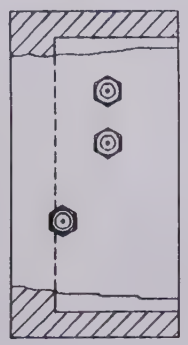
DWG. NO. 1009543

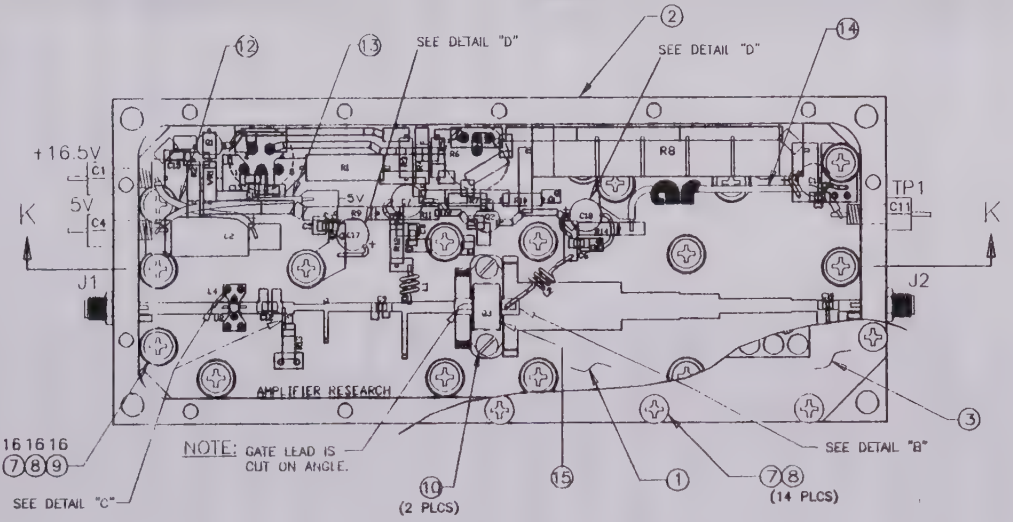
SCALE NONE | SHEET 1 OF 1 | REV. B

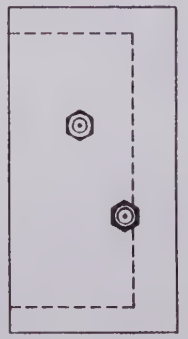
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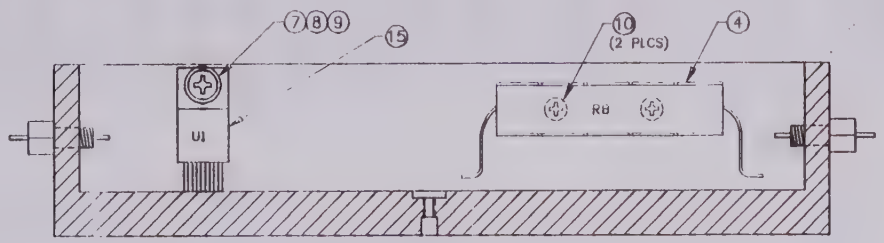
RELEASE NO. 1178-01

ECN	DATE	REV
REL	28JUL98	–
9798	25NOV98	A
10163	13SEP99	B
10215	20OCT99	C
10338	10JAN00	D









SECTION K-K

NOTES:

1.0 INSTALL PWB INTO HOUSING. CENTER THE CUTOUT FOR THE FET'S OVER THE 2-56 FET MOUNTING SCREW HOLES.

2.0 TIGHTEN ALL MOUNTING SCREWS FOR PWB BEFORE BEFORE BEGINNING INSTALLATION OF COMPONENTS.

3.0 INSTALL ALL COMPONENTS INTO HOUSING BEFORE FET INSTALLATION. THIS MUST BE DONE LAST.

CAUTION

4.0 THE FET INSTALLATION MUST BE DONE AT A STATIC APPROVED WORK STATION. PERSONS HANDLING AND INSTALLING THE FET'S, MUST BE FAMILAR WITH GaAs FET HANDLING PROCEDURES. THE GaAs FET CAN BE DESTROYED BOTH ELECTRICALLY AND MECHANICALLY.

5.0 DO NOT PUSH THE GATE OR DRAIN LEADS DOWN TO THE PC BOARD WHEN INSTALLING THE FET. USE SOLDER TO FILL THE AREA BETWEEN THE LEAD AND THE PC BOARD.

DETAIL "A"



TRIM TEFLON OF PARTS J1 & J2 FLUSH WITH CONNECTOR BODY. CUT CENTER PIN TO 0.075"(IN). INSTALL CONNECTOR FLUSH WITH INNER HOUSING WALL. TIGHTEN LOCKING NUT "A" SECURELY. (DO NOT USE SUPPLIED WASHER)

DETAIL "C"

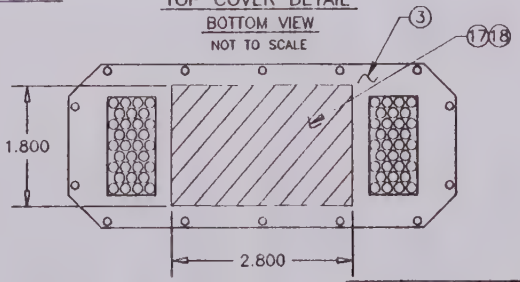
NOT TO SCALE



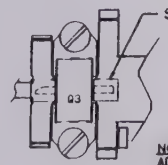
TOP COVER DETAIL

BOTTOM VIEW

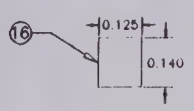
NOT TO SCALE



FOR BOM SEE: 1009542-501

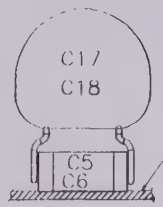


DETAIL "B"



NOTE:
ADD PIECE OF ITEM 16 (0.003 THK BRASS SHIM STOCK) TINNED TO TOP SIDE OF BOTH THE GATE AND DRAIN LEADS OF Q3.

DETAIL "D"



NOTES:

INSTALL TANT. CAP ON TOP OF CHIP CAPS AS SHOWN. KEEPING LEADS AS SHORT AS POSSIBLE. (SIDE VIEW)

ITEM QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
	PARTS LIST				

UNLESS OTHERWISE SPECIFIED DO NOT SCALE DRAWING DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS. ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2 REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015

ANGULAR DIMENSIONS 1/2°

25S1G4A
USED ON MODEL

DRAWN C.GWYNN DATE 11 MAY 98
CHKD M. BICKELMAN DATE 27 JUL 98
MECH J.MAGINN DATE 30 JULY 98
ELEC F.SCHIRK DATE 29 JULY 98

AMPLIFIER RESEARCH

ASSEMBLY
4 WATT AMP

DWG. NO. 1009542

SCALE 2/1 SHEET 1 OF 1 REV. D

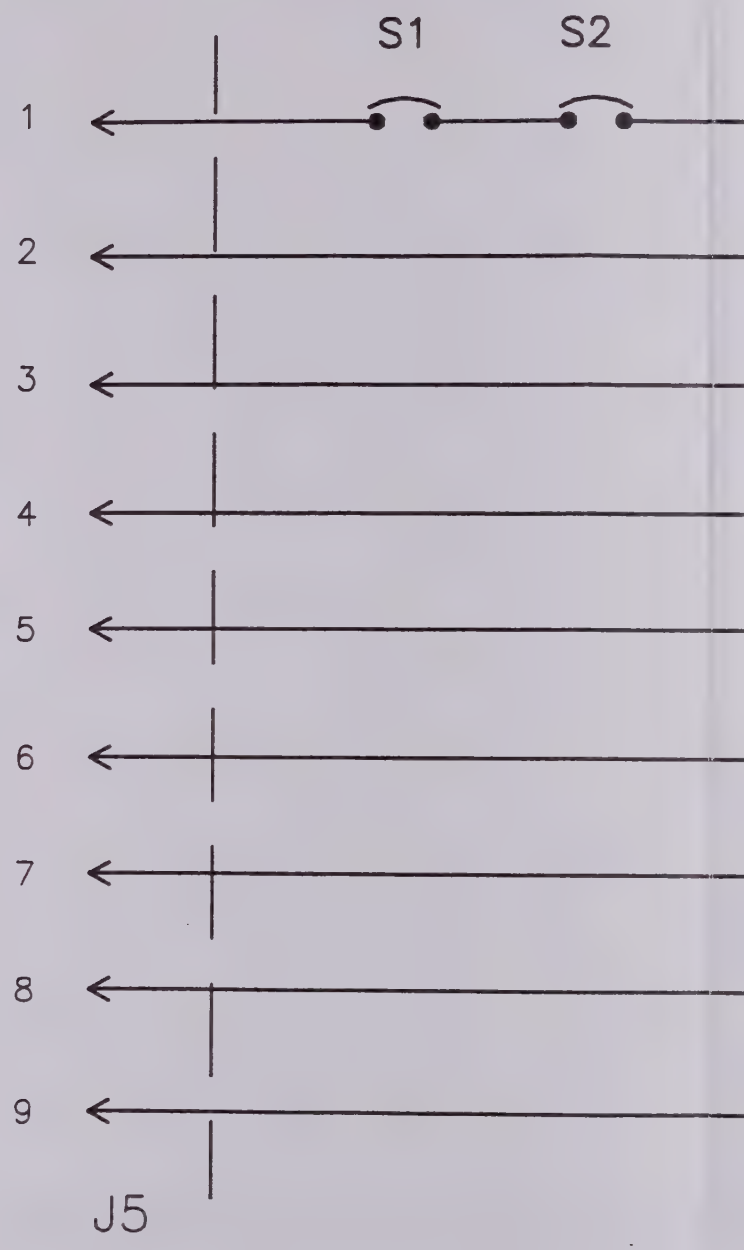
AMPLIFIER RESEARCH

11:22:32 02 MAY 2001 * * * SINGLE LEVEL BILL OF MATERIAL LISTING * * * REPORT: E0056 PAGE: 1

BILL NO: 1009542-501 REV: B U/M: EA DRAWING NO: ARC-C\1009542
4 WATT AMP ASSY

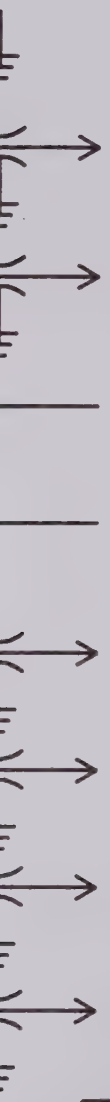
SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1009542	D	ASSY DWG,4 WATT AMP ASSY	EA	REF	ARC-C\1009542	
0010	1009543	B	SCHEM,4 WATT AMP	EA	REF	ARC-C\1009543	
0400	27099		CAPR,FEED-THRU,FILT,2500PF,500V	EA	3.000	MET\51-719-011	C1 ,C4 C11
0410	27068		CAPR,ELECT,100uF,50VDC,AXIAL	EA	1.000	ICI\107TTA050M	C2
0420	27039		CAPR,CHIP,CER,1000pF,10%,50V	EA	5.000	ATC\700B102MCA50X	C3 ,C5 C6 ,C9 C10
0423	27182		CAPR,CER,200pF,10%,600/1000V,CHAR S3N	EA	1.000	MUE\GH-201K	C7
0425	27251		CAPR,CHIP,0.039uF,20%,50V	EA	4.000	ATC\200B393MP50	C8 ,C13 C14 ,C15
0430	27024		CAPR,CHIP,5.1pF,0.5%,500V	EA	1.000	DIL\C17AH5R1D500NT	C12
0440	27060		CAPR,ELECT,100uF,50V,RADIAL	EA	1.000	ICI\107RMR050M	C16
0450	27055		CAPR,TANT,6.8UF,50V	EA	1.000	MAL\TDC685K050NLF	C17
0460	27051		CAPR,TANT,33UF,35VDC,EPOXY	EA	1.000	AVX\TAP336K035HSB	C18
1500	41243		CONN,COAX,BULKHD JACK,SMA,(F)	EA	2.000	DTA\1321000K82165	J1 ,J2
1800	1007507-102	-	INDUCTOR,AIR WOUND,.050ID,34GA,5T	EA	1.000	ARC-A\1007507	L1
1805	1007507-105	-	INDUCTOR,AIR WOUND,.125ID,28GA,2T	EA	1.000	ARC-A\1007507	L2
1810	66052		WIRE,MAGNET,SOLDERABLE,28 AWG,GRN	EA	2.000		L3 ,L4
2500	2N3904		XSTR,SWNG,NPN,40V,0.2A,1W	EA	1.000		Q1
2510	2N3906		XSTR,SWNG,PNP,40V,0.2A,1W	EA	1.000	ARE\2N3906	Q2
2520	1000034-182	BH	XSTR,RF,PWR,GaAsFET	EA	1.000	ARC-A\1000034	Q3
2530	55715-R180J		RES,FXD,WW,0.18,5%,2W,TYPE SPH	EA	1.000		R1
2710	55612-3301J		RES,FXD,METAL FILM,3.3K,5%,1/4-1/2W	EA	2.000	TRW\GP55-3301+/-5%	R2 ,R4
2720	55612-1001J		RES,FXD,METAL FILM,1K,5%,1/4-1/2W	EA	2.000	TRW\GP55-1001+/-5%	R3 ,R14
2740	55612-6800J		RES,FXD,METAL FILM,680,5%,1/4-1/2W	EA	1.000	TRW\680 OHM 1/2W5%	R5

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REL NO. 1196-03

ECN	DATE	REV
REL	26MAY99	–



C28, (AMP FAULT) A7,A8,A11,A12,A13,& A14

C4 (-5V INPUT) A7,A8,A11,A12,A13,& A14

N/C

N/C

C1 (+16.5V INPUT) A8,& A14

C1 (+16.5V INPUT) A12

C1 (+16.5V INPUT) A7,& A13

C1 (+16.5V INPUT) A11

QTY. REQD.	ITEM	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015
ANGULAR DIMENSIONS 1/2°		

100S1G4
USED ON MODEL

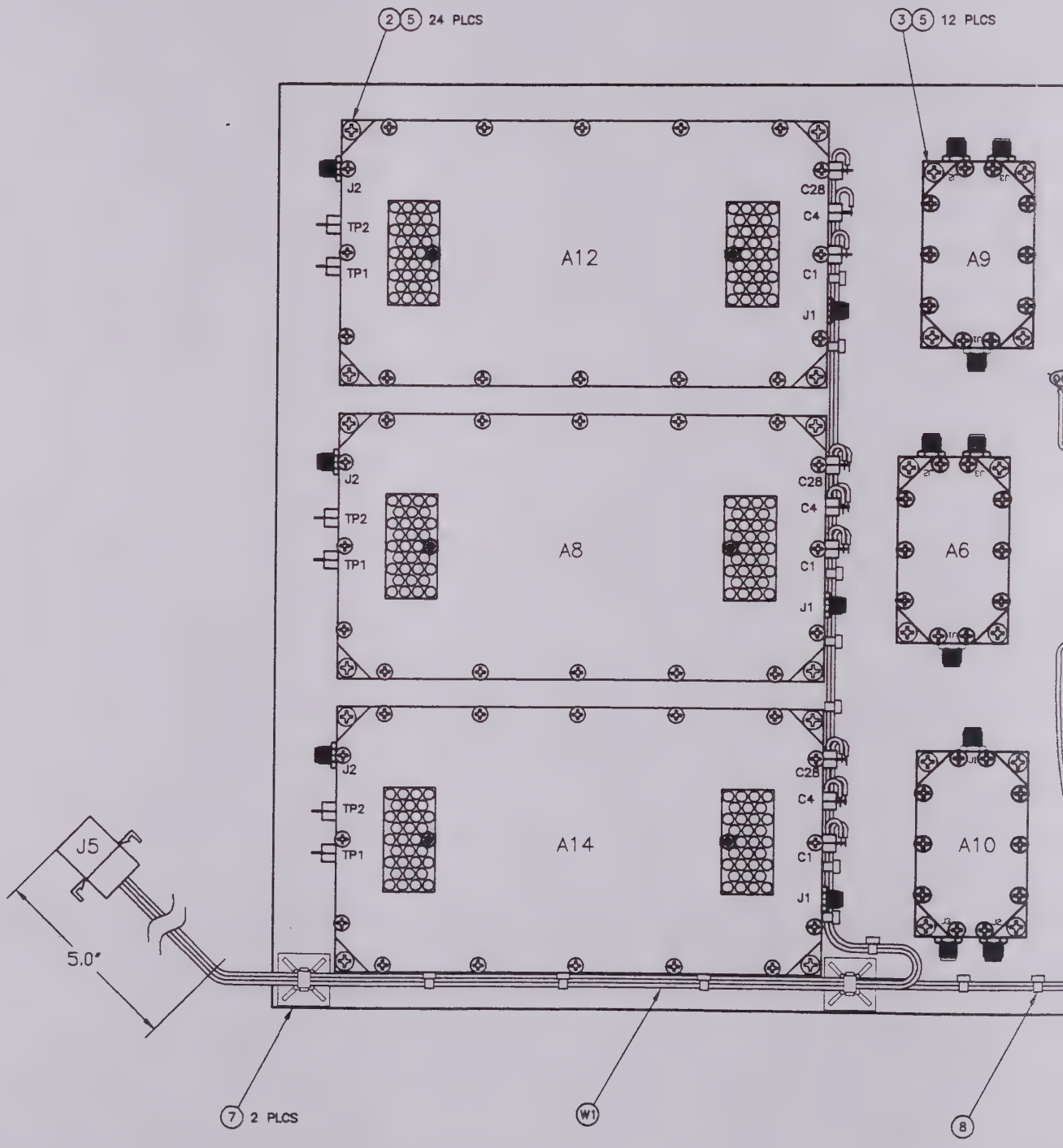
DRAWN A.REED DATE 9 SEPT 98
CHKD A.REED DATE 26 MAY 99
MECH DATE
ELEC DATE

AMPLIFIER RESEARCH

WIRING DIAG TOP HEATSINK

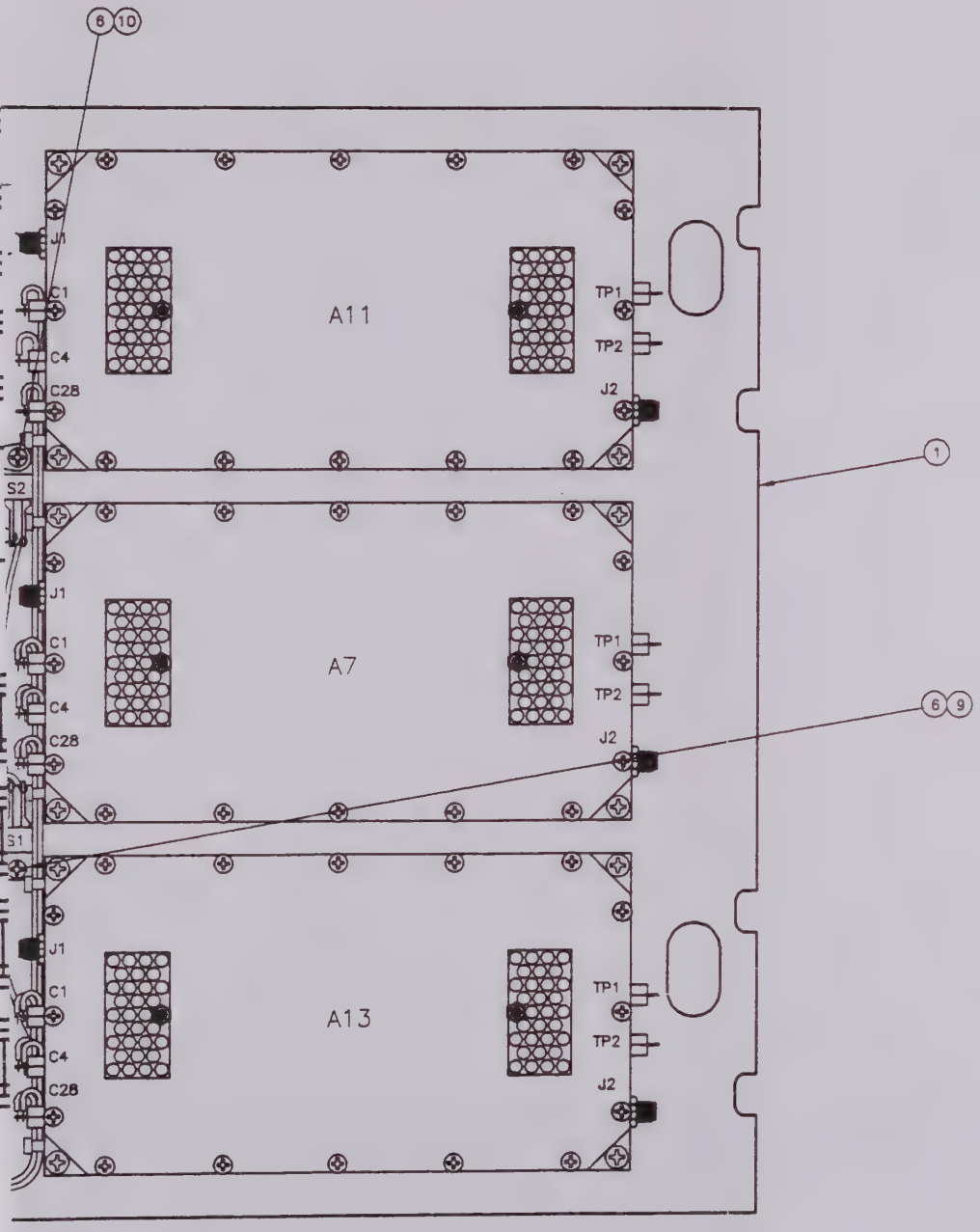
DWG. NO. 1010015

SCALE NONE | SHEET 1 OF 1 | REV. —


(2)(5) 24 PLCS
(3)(5) 12 PLCS
A12
A8
A14
A9
A6
A10
J2
TP2
TP1
C28
C4
C1
J1
J5
5.0"
(7) 2 PLCS
(W1)
(8)

REL. NO. 1196-03

ECN	DATE	REV
REL.	28MAY99	--
10154	30AUG99	A



ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.08	±.015

ANGULAR DIMENSIONS 1/2°

100S1G4
USED ON MODEL

DRAWN A.REED DATE 29 JUN 98
CHKD A.REED DATE 26 MAY 99
MECH J.MAGINN DATE 6/16/99
ELEC F.SCHIRK DATE 02 JUN 99

AMPLIFIER RESEARCH

HEATSINK
TOP SIDE ASSEMBLY

DWG. NO. 1009690

SCALE 1/1 SHEET 1 OF 1 REV. A

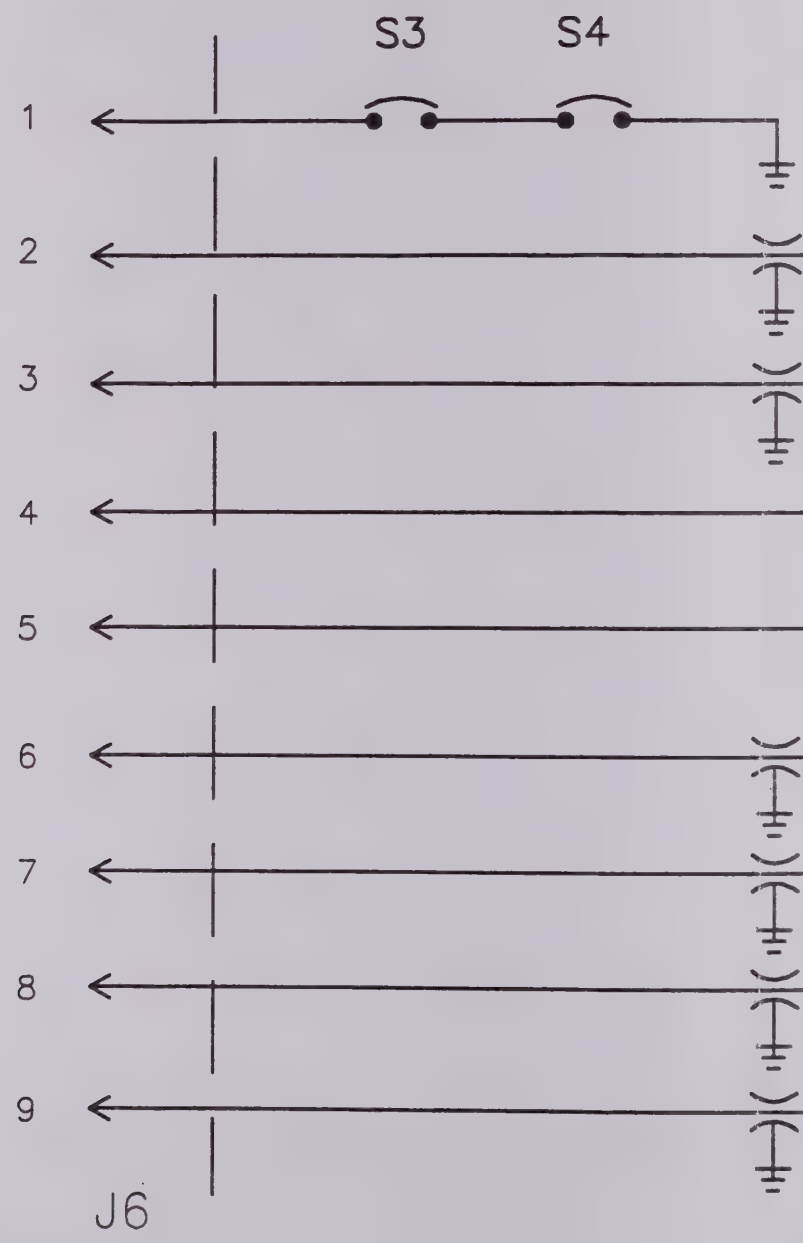
AMPLIFIER RESEARCH

11:22:37 02 MAY 2001 * * * SINGLE LEVEL BILL OF MATERIAL LISTING * * * REPORT: E0056 PAGE: 1

BILL NO: 1010930-501 REV: - U/M: EA DRAWING NO: ARC-D\1009690
HEATSINK ASSY,TOP

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1009690	A	ASSY DWG,HEATSINK,TOP SIDE	EA	REF	ARC-D\1009690	
0020	1010015	-	SCHEM DIAG,TOP HEATSINK ASSY	EA	REF	ARC-B\1010015	
0030	1010078	A	WIRE LIST,HEATSINK TOP SIDE	EA	REF	ARC-A\1010078	
0040	1010189-101		HARNESS BD,HEATSINK TOP SIDE	EA	REF		
0100	1008630-501	-	PWB ASSY,2 WAY SPLITTER	EA	3.000	ARC-B\1008630	A6 ,A9 A10
0110	1010886-501	C	PWB ASSY,QUAD AMP	EA	6.000	ARC-A\1010886	A7 ,A8 A11 ,A12 A13 ,A14
1500	41103		CONN,PLUG,9 PIN	EA	1.000	MOL\03-09-2092	J5
1510	41107		TERM,.093 DIA,CRIMP TYPE,M,18-22 AWG	EA	8.000	MOL\02-09-2118	J5
3100	57062		SW,TEMP SENSING,N.C.,OPEN AT 70C	EA	2.000	AIR\67L070	S1 ,S2
5000	1009337-301	-	HEATSINK,TOP	EA	1.000	ARC-D\1009337	1
5010	11025		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X 1.50	EA	24.000	\MS51957-36	2
5020	11024		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X 1.25	EA	12.000	\MS51957-35	3
5030	11014		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X .25	EA	2.000	\MS51957-26	4
5040	12048		WASH,LOCK,SPLIT,S/S,#6	EA	38.000	\MS35338-136	5
5050	11010		SCREW,MACH,PAN HD,CROSS-REC,S/S,4-40 X .25	EA	2.000	\MS51957-13	6
5060	69238	-	BASE,MTG,CABLE TIE,ADH BACK,3/4 X 3/4	EA	2.000	TAB\TC-344A	7
5070	69161		CABLE TIES,1 3/8 MAX BUNDLE DIA,5 5/8 L	EA	A/R	PNT\PLT1.5MP	8
5080	12047		WASH,LOCK,SPLIT,S/S,#4	EA	1.000	\MS35338-135	9
5090	69099		LUG,SHAKEPROOF,BENT,41/64 L,#4 STUD,DUAL HOLE	EA	1.000	HHS\1416-4	10
5100	66020		WIRE,TFE,18 AWG,STRANDED,TYPE E,BLU	IN	A/R		
5110	66032		WIRE,TFE,22 AWG,STRANDED,TYPE E,VIO	IN	A/R		
5120	66077		WIRE,TFE,22 AWG,STRANDED,TYPE E,WHT/BLK	IN	A/R		
5130	66079		WIRE,TFE,22 AWG,STRANDED,TYPE E,WHT/RED	IN	A/R		

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SENT OF AMPLIFIER RESEARCH.



REL NO. 1196-03

ECN	DATE	REV
REL	26MAY99	–

→ C28, (AMP FAULT) A27,A28,A29,A30,A31,A32,A33,& A34

→ C4 (−5V INPUT) A27,A28,A29,A30,A31,A32,A33,& A34

— N/C

— N/C

→ C1 (+16.5V INPUT) A27,& A28

→ C1 (+16.5V INPUT) A29,& A30

→ C1 (+16.5V INPUT) A31,& A32

→ C1 (+16.5V INPUT) A33,& A34

QTY. REQD.	ITEM	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015

ANGULAR DIMENSIONS 1/2°

100S1G4
USED ON MODEL

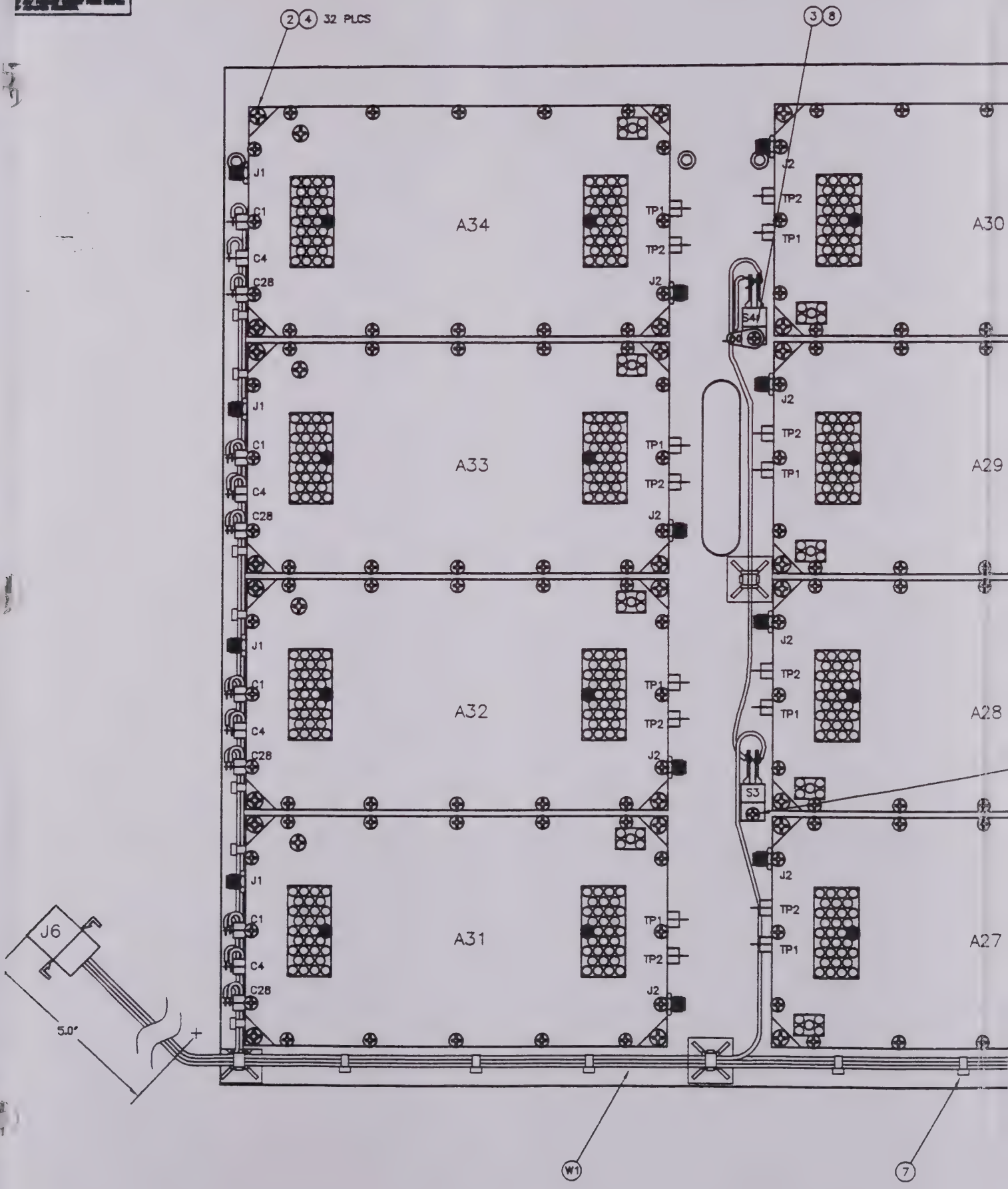
DRAWN A.REED DATE 9 SEPT 98
CHKD A.REED DATE 26 MAY 99
MECH DATE
ELEC DATE

AMPLIFIER RESEARCH

WIRING DIAG RT SIDE HEATSINK

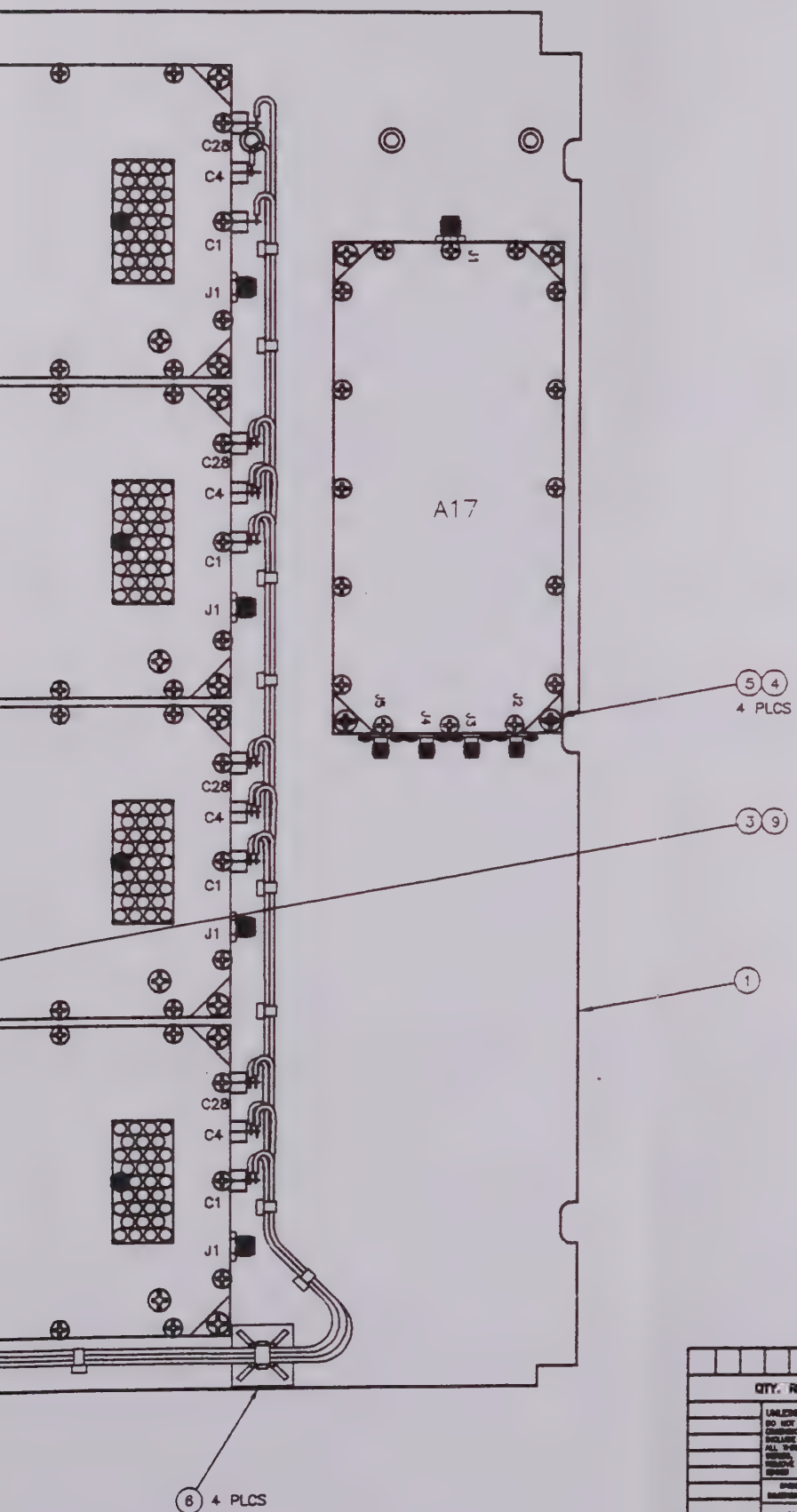
DWG. NO. 1010014

SCALE NONE | SHEET 1 OF 1 | REV. —


2 4 32 PLCS
3 8
A34
A33
A32
A31
A30
A29
A28
A27
J1
C1
C4
C28
TP1
TP2
J2
S41
S3
J6
5.0"
W1
7

REL NO. 1166-03

ECN	DATE	REV
REL	29MAY99	--
002012	21SEP98	A



ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND TOLERANCE PLACES THEREWISE
ALL THREADS ARE UNIFIED NATIONAL, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

SIZE DESIGNATED	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.03	±.005
OVER 6 TO 24	±.03	±.010
OVER 24	±.03	±.010

ANGULAR DIMENSIONS ±1°

DRWN	A.REED DATE 26 JUN 98
CHKD	A.REED DATE 26 MAY 99
MECH	J.MAGINN DATE 18 JUNE 99
ELEC	F.SCHIRK DATE 02 JUNE 99

AMPLIFIER RESEARCH

HEATSINK, RT SIDE ASSEMBLY

DWG. NO. 1009469

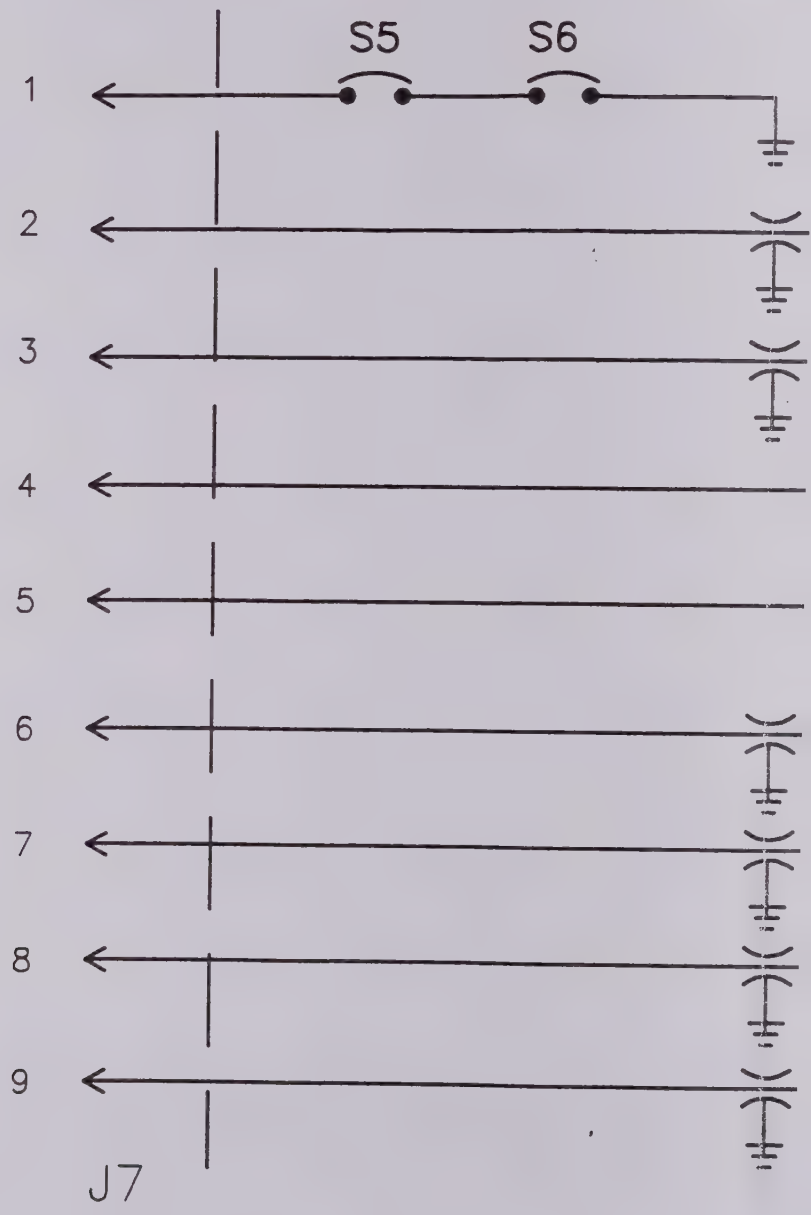
100S1C4
USED ON MODEL

SCALE 1/1 SHEET 1 OF 1 REV. A

BILL NO: 1010928-501 REV: - U/M: EA DRAWING NO: ARC-D\1009469
HEATSINK ASSY,RS

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1009469	A	ASSY DWG,HEATSINK,RS	EA	REF	ARC-D\1009469	
0020	1010014	-	SCHEM DIAG,RIGHT HEATSINK ASSY	EA	REF	ARC-B\1010014	
0030	1010079	A	WIRE LIST,HEATSINK R/S	EA	REF	ARC-A\1010079	
0040	1010190-101		HARNESS BD,HEATSINK R/S	EA	REF		
0100	1010072-501	A	PWB ASSY,4 WAY SPLITTER #3	EA	1.000	ARC-D\1010072	A17
0110	1010886-501	C	PWB ASSY,QUAD AMP	EA	8.000	ARC-A\1010886	A27 ,A28 A29 ,A30 A31 ,A32 A33 ,A34
1500	41103		CONN,PLUG,9 PIN	EA	1.000	MOL\03-09-2092	J6
1510	41107		TERM,.093 DIA,CRIMP TYPE,M,18-22 AWG	EA	8.000	MOL\02-09-2118	J6
3100	57062		SW,TEMP SENSING,N.C.,OPEN AT 70C	EA	2.000	AIR\67L070	S3 ,S4
5000	1009339-301	A	HEATSINK,R/S	EA	1.000	ARC-D\1009339	1
5010	12025		WASH,FLAT,A,.500 OD X .257 ID X .187 THK	EA	32.000	PCI\9254-A-257	2
5020	11010		SCREW,MACH,PAN HD,CROSS-REC,S/S,4-40 X .25	EA	2.000	\MS51957-13	3
5030	12048		WASH,LOCK,SPLIT,S/S,#6	EA	38.000	\MS35338-136	4
5040	11023		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X 1	EA	4.000	\MS51957-34	5
5050	69238	-	BASE,MTG,CABLE TIE,ADH BACK,3/4 X 3/4	EA	4.000	TAB\TC-344A	6
5060	69161		CABLE TIES,1 3/8 MAX BUNDLE DIA,5 5/8 L	EA	A/R	PNT\PLT1.5MP	7
5070	69099		LUG,SHAKEPROOF,BENT,41/64 L,#4 STUD,DUAL HOLE	EA	1.000	HHS\1416-4	8
5075	12047		WASH,LOCK,SPLIT,S/S,#4	EA	1.000	\MS35338-135	9
5080	66020		WIRE,TFE,18 AWG,STRANDED,TYPE E,BLU	IN	A/R		
5090	66032		WIRE,TFE,22 AWG,STRANDED,TYPE E,VIO	IN	A/R		
5100	66077		WIRE,TFE,22 AWG,STRANDED,TYPE E,WHT/BLK	IN	A/R		
5110	66079		WIRE,TFE,22 AWG,STRANDED,TYPE E,WHT/RED	IN	A/R		

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REL NO. 1196-03

ECN	DATE	REV
REL	26MAY99	—

→ C28, (AMP FAULT) A19,A20,A21,A22,A23,A24,A5,& A26

→ C4 (−5V INPUT) A19,A20,A21,A22,A23,A24,A5,& A26

— N/C

— N/C

→ C1 (+16.5V INPUT) A19,& A20

→ C1 (+16.5V INPUT) A21,& A22

→ C1 (+16.5V INPUT) A23,& A24

→ C1 (+16.5V INPUT) A25,& A26

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015
ANGULAR DIMENSIONS 1/2°		

100S1G4
USED ON MODEL

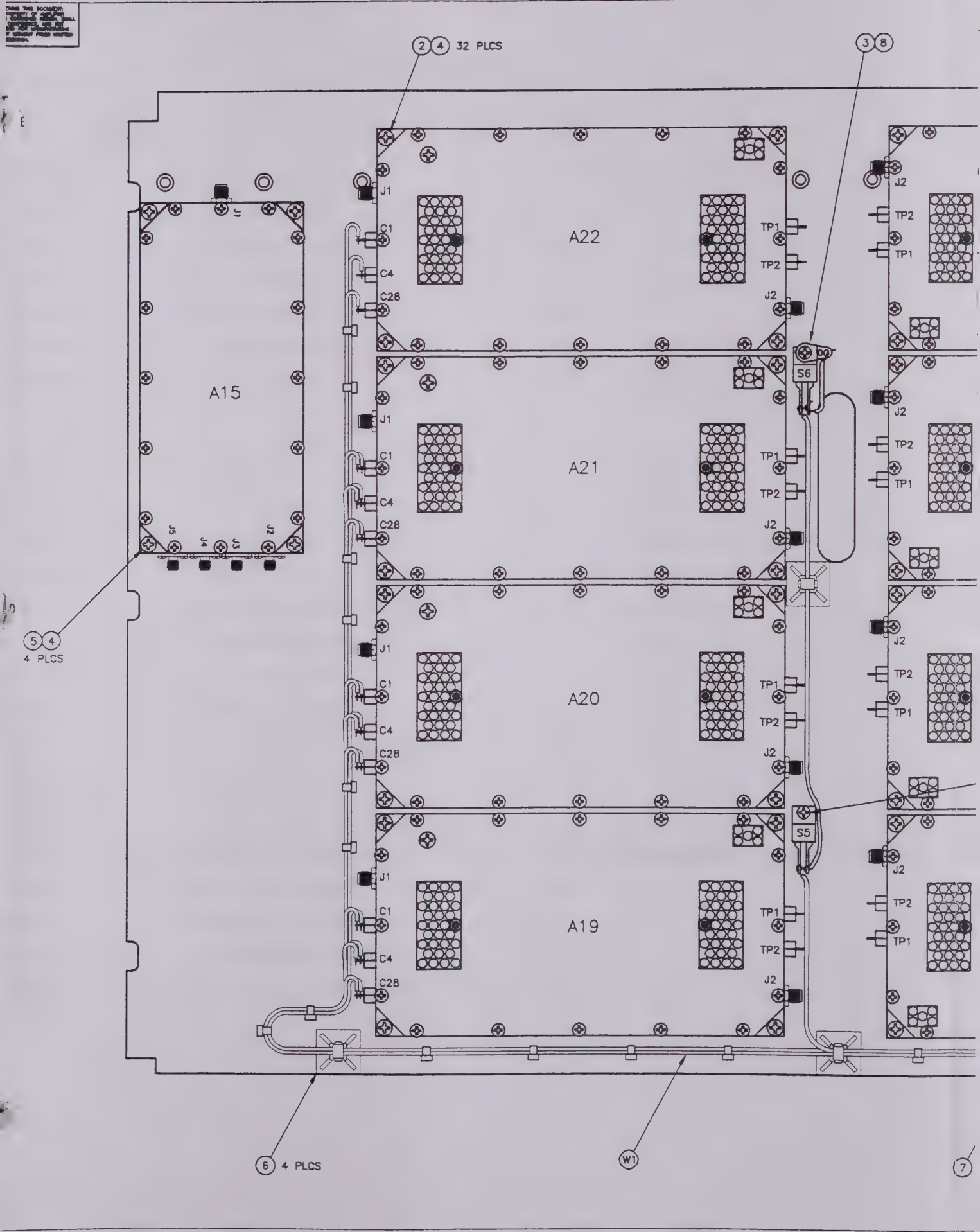
DRAWN A.REED DATE 9 SEPT 98
CHKD A.REED DATE 26 MAY 99
MECH DATE
ELEC DATE

AMPLIFIER RESEARCH

WIRING DIAG LEFT HEATSINK

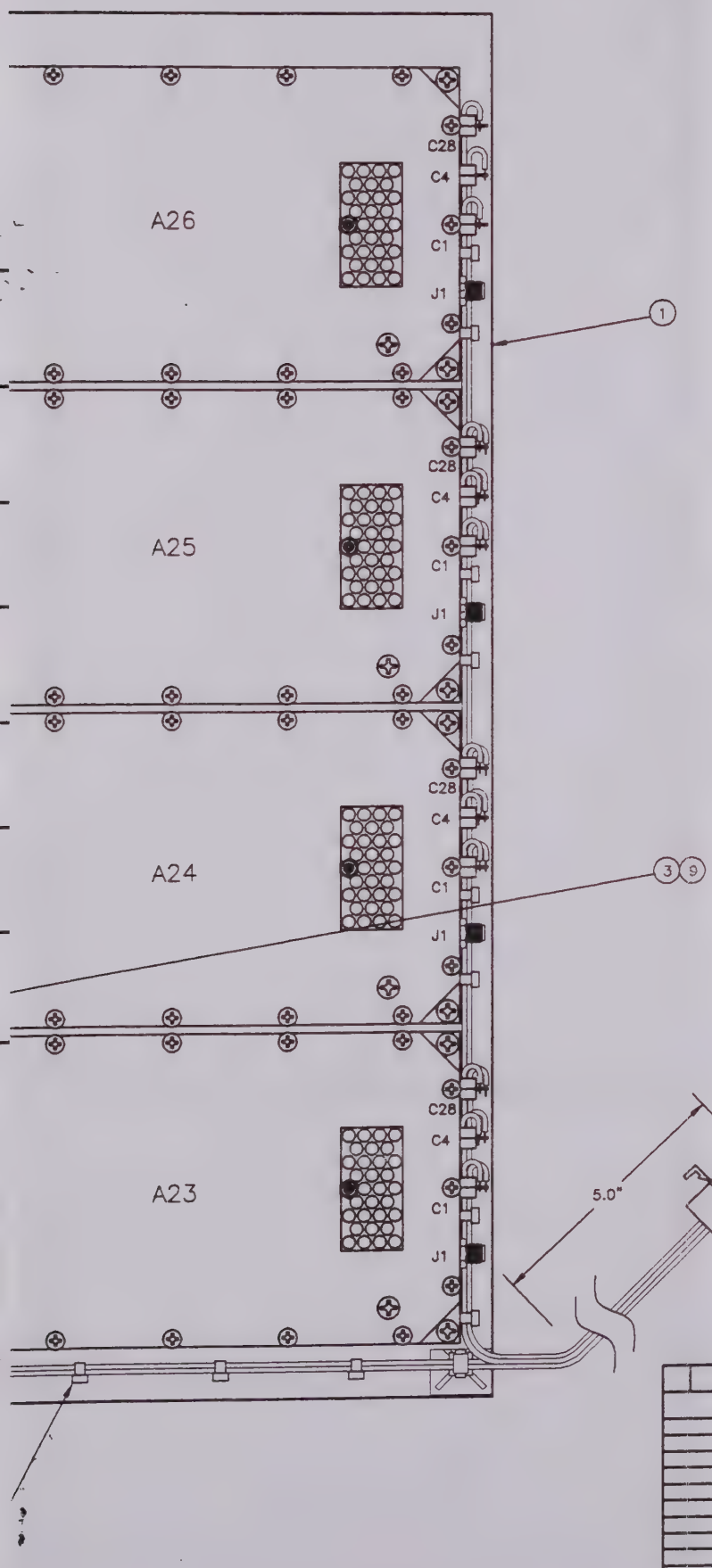
DWG. NO. 1010016

SCALE NONE | SHEET 1 OF 1 | REV. —


2 4 32 PLCS
3 8
A22
A21
A20
A19
A15
J1
C1
C4
C28
J2
TP1
TP2
S6
S5
5 4
4 PLCS
6 4 PLCS
W1
7

REL NO. 1196-03

ECN	DATE	REV
REL	26MAY99	-
10201	21SEPT99	A



QTY. REQD.	ITEM	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015

ANGULAR DIMENSIONS ±2°

100S1G4
USED ON MODEL

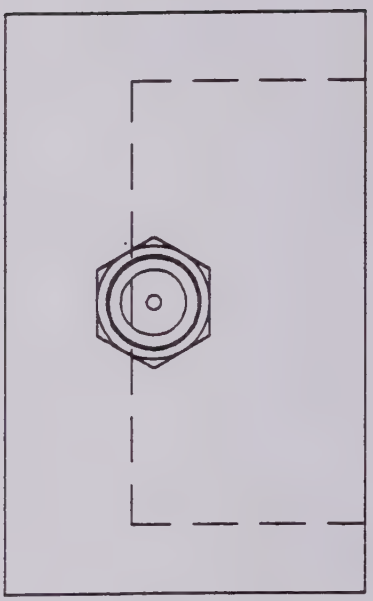
DRAWN A.REED DATE 18JUN98
CHKD A.REED DATE 26 MAY 99
MECH J.MAGINN DATE 16 JUNE 99
ELEC F.SCHIRK DATE 02 JUNE 99

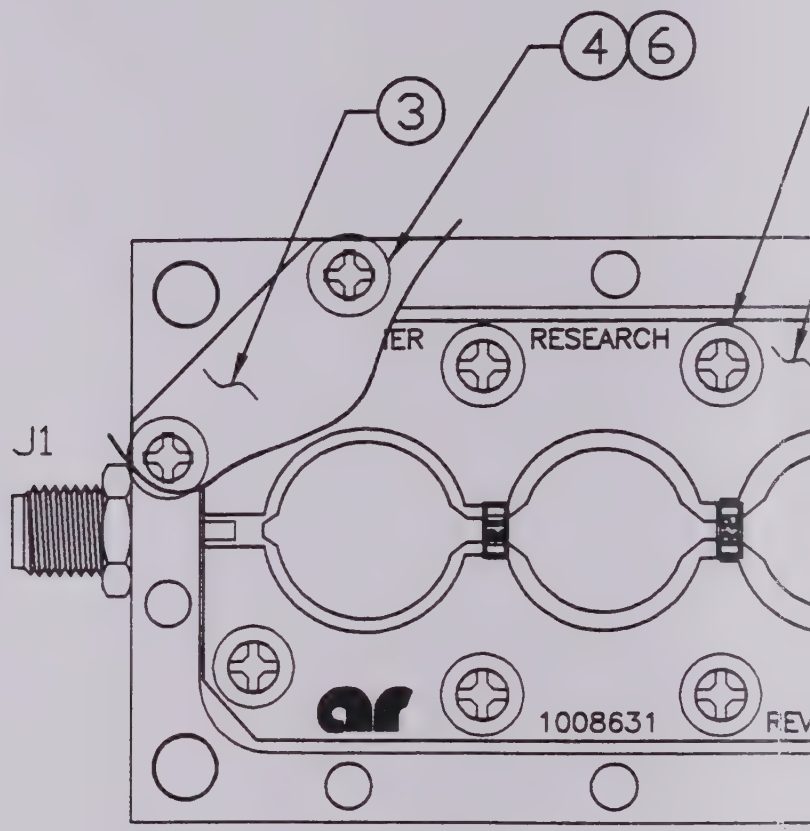
AMPLIFIER RESEARCH

HEATSINK
LEFT SIDE ASSEMBLY

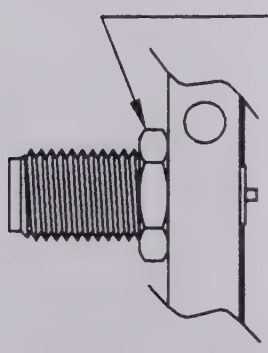
DWG. NO. 1009689

SCALE 1/1 SHEET 1 OF 1 REV. A



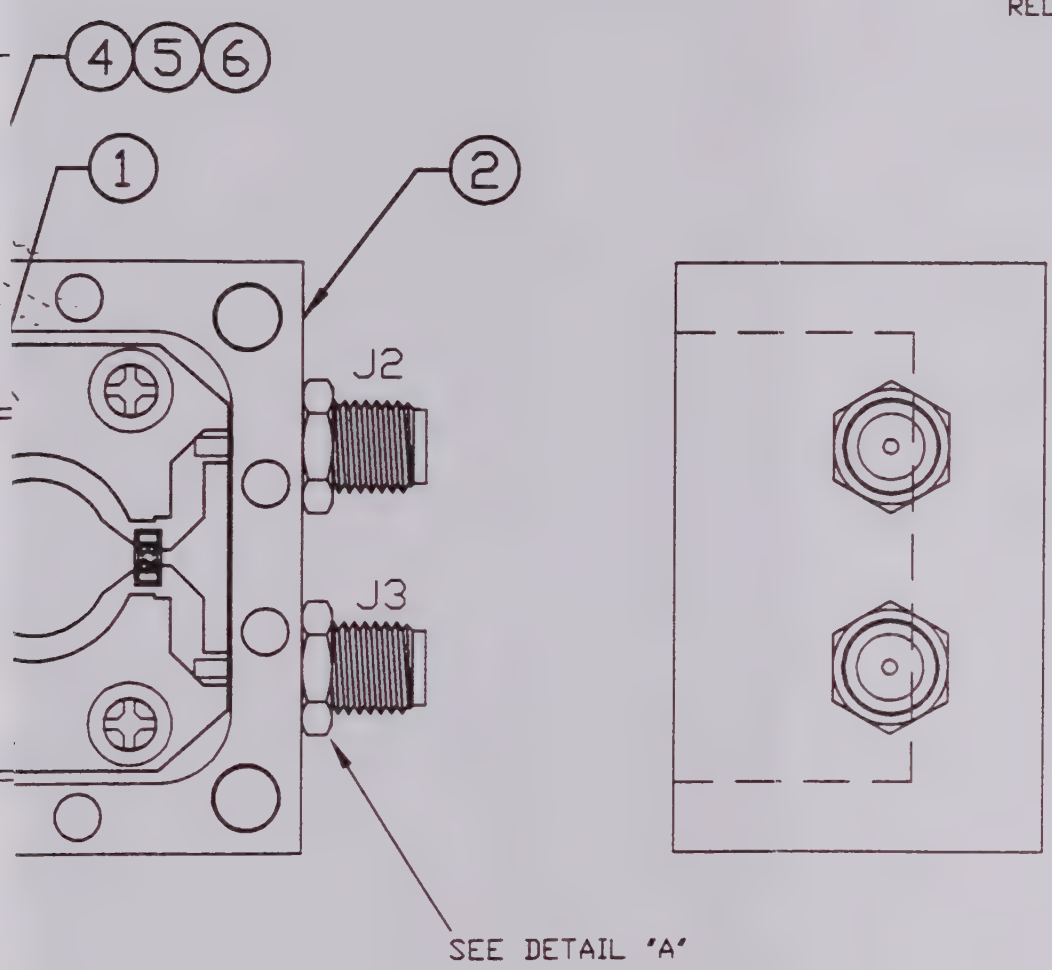


DETAIL "A"



TRIM TEFLON OF PARTS J1,J2 AND J3 FLUSH WITH CONNECTOR BODY.
CUT CENTER PIN TO 0.075"(IN)
INSTALL CONNECTOR FLUSH WITH INNER HOUSING WALL. TIGHTEN LOCKING NUT "A" SECURELY.
(DO NOT USE SUPPLIED WASHER)

ECN	DATE	REV
XXXX	14MAR97	1
REL.1154-02 REL	20NOV97	—



FOR BOM SEE 1008630-501

ITEM	PART NO.	DESCRIPTION	MARK	FIN	MATL
QTY. REQD.	PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015
ANGULAR DIMENSIONS 1/2°		

50S1G4
USED ON MODEL

DRAWN J.H.REED DATE 14 MAR 97
CHKD J.H.REED DATE 20 NOV 97
MECH DATE
ELEC DATE

AMPLIFIER RESEARCH

ASSEMBLY 2 WAY SPLITTER

DWG. NO. 1008630

SCALE NONE | SHEET 1 OF 1 | REV. —

BILL NO: 1008630-501 REV: - U/M: EA DRAWING NO: ARC-B\1008630
PWB ASSY,2 WAY SPLITTER

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1008632	-	SCHEM DIAG,2 WAY SPLITTER	EA	REF	ARC-B\1008632	
0020	1008630	-	ASSY DWG,2 WAY SPLITTER	EA	REF	ARC-B\1008630	
1500	41243		CONN,COAX,BULKHD JACK,SMA,(F)	EA	3.000	DTA\1321000K82165	J1 ,J2 J3
2700	55647-1200J		RES,FXD,CHIP,120,5%,1/8W	EA	1.000	D-K\P120-ECT-ND	R1
2710	55647-2200J		RES,FXD,CHIP,220,5%,1/8W	EA	1.000	D-K\P220-ECT-ND	R2
2720	55647-2700J		RES,FXD,CHIP,270,5%,1/8W	EA	1.000	D-K\P270-ECT-ND	R3
5000	1008631-101	-	PWB,2 WAY SPLITTER	EA	1.000	ARC-B\1008631	1
5010	1008635-101	-	HSG,2 WAY SPLITTER	EA	1.000	ARC-B\1008635	2
5020	1008636-101	A	COVER,2 WAY SPLITTER	EA	1.000	ARC-B\1008636	3
5030	11010		SCREW,MACH,PAN HD,CROSS-REC,S/S,4-40 X .25	EA	18.000	\MS51957-13	4
5040	12010		WASH,FLAT,S/S,#4,.250 OD X .125 ID X .022 THK	EA	8.000	\MS15795-803	5
5050	12047		WASH,LOCK,SPLIT,S/S,#4	EA	18.000	\MS35338-135	6

AMPLIFIER RESEARCH

:51:41 03 MAY 2001 * * * SINGLE LEVEL BILL OF MATERIAL LISTING * * * REPORT: E0056 PAGE: 1

BILL NO: 1010886-501 REV: C U/M: EA DRAWING NO: ARC-A\1010886
PWB ASSY,QUAD AMP

	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
.0	1010919	-	SCHEMATIC,QUAD AMP	EA	REF	ARC-C\1010919	
0	1010886	A	ASSY DWG,PWB,QUAD AMP	EA	REF	ARC-A\1010886	
0	1009161-501	K	PWB ASSY,QUAD AMP,100S1G4	EA	1.000	ARC-A\1009161	
0	77144	-	SHIM,BRASS,6.00X.003 THK (ROLL 100")	IN	A/R	MSS\00051037	25

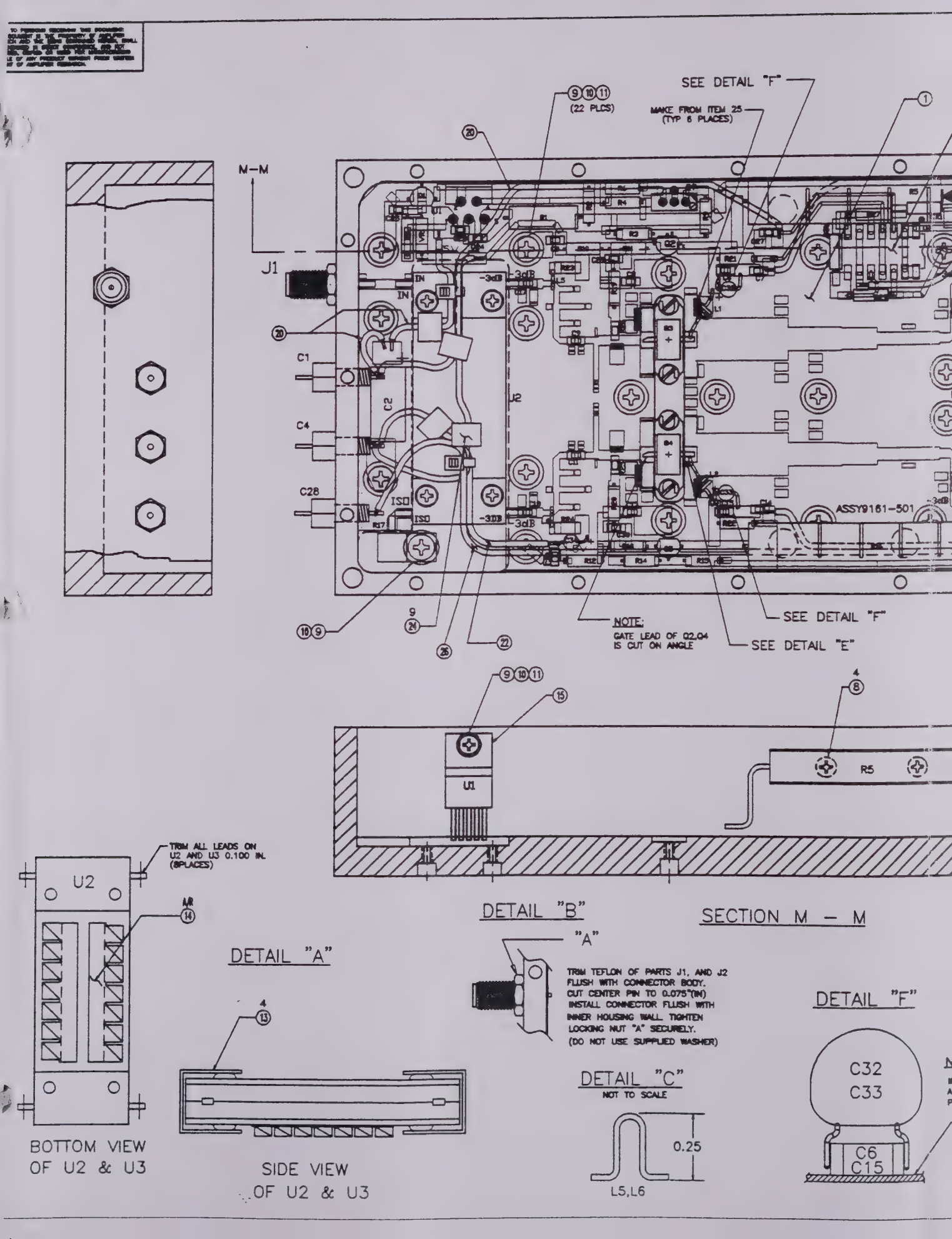
* END OF REPORT E0056 - 08:51:41 03 MAY 2001 * * *

BILL NO: 1009161-501 REV: K U/M: EA DRAWING NO: ARC-A\1009161
PWB ASSY,QUAD AMP,100S1G4

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1009163	E	SCHEM DIAG,QUAD AMP,100S1G4	EA	REF	ARC-C\1009163	
0020	1009161	G	ASSY DWG,QUAD AMP	EA	REF	ARC-D\1009161	
0400	27099		CAPR,FEED-THRU,FILT,2500PF,500V	EA	5.000	MET\51-719-011	C1 ,C4 C21 ,C22 C28
0410	27068		CAPR,ELECT,100uF,50VDC,AXIAL	EA	2.000	ICI\107TTA050M	C2 ,C26
0420	27039		CAPR,CHIP,CER,1000pF,10%,50V	EA	10.000	ATC\700B102MCA50X	C3 ,C5 C6 ,C9 C10 ,C11 C12 ,C15 C16 ,C20
0425	27251		CAPR,CHIP,0.039uF,20%,50V	EA	8.000	ATC\200B393MP50	C7 ,C8 C13 ,C14 C23 ,C24 C25 ,C27
0430	27024		CAPR,CHIP,5.1pF,0.5%,500V	EA	2.000	DIL\C17AH5R1D500NT	C17 ,C18
0450	27028		CAPR,CHIP,200pF,20%,300V	EA	2.000	DIL\C17AH201M3TXL	C29 ,C30
0460	27047		CAPR,TANT,1UF,50V	EA	1.000	MAL\TDC105K050WSE	C31
0470	27051		CAPR,TANT,33UF,35VDC,EPOXY	EA	2.000	AVX\TAP336K035HSB	C32 ,C33
0700	30044		DIODE,SW,30mA,SM	EA	1.000	D-K\MA704ACT-ND	CR1
1000	33003		LED,RED,T1 3/4(5mm)	EA	1.000	H-P\HLMP-3001-009	DS1
1500	41243		CONN,COAX,BULKHD JACK,SMA,(F)	EA	2.000	DTA\1321000K82165	J1 ,J2
1800	1007507-105	-	INDUCTOR,AIR WOUND,.125ID,28GA,2T	EA	2.000	ARC-A\1007507	L1 ,L2
1810	66251		WIRE,BUSS,TINNED COPPER,28 AWG	IN	A/R	WEI\9028	L5 ,L6
2500	54561		XSTR,NPN,GEN PURPOSE	EA	1.000	MOT\MMBT3904LT1	Q1
2510	54562		XSTR,PNP,GEN PURPOSE	EA	2.000	MOT\MMBT3906LT1	Q2 ,Q5
2520	1000034-182A	BL	XSTR,RF,PWR,GaAsFET,SELECTED	EA	2.000	ARC\1000034	Q3 ,Q4
2700	55715-R180J		RES,FXD,WW,0.18,5%,2W,TYPE SPH	EA	1.000		R1
2705	55647-1200J		RES,FXD,CHIP,120,5%,1/8W	EA	1.000	D-K\P120-ECT-ND	R2

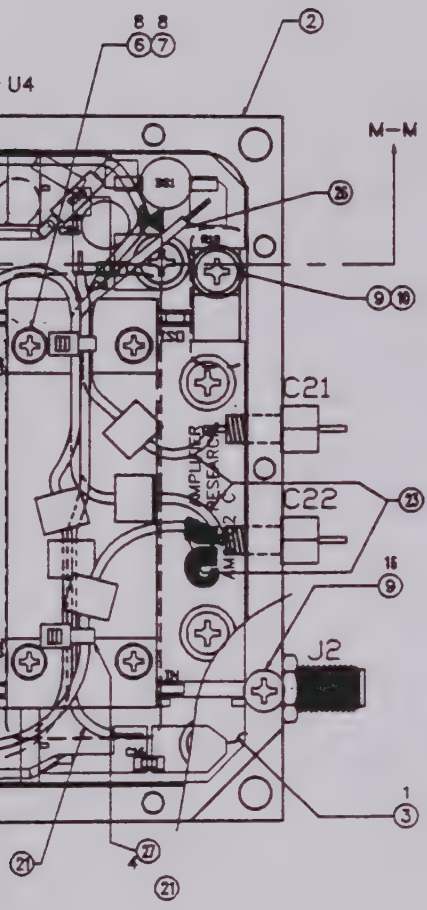
BILL NO: 1009161-501 REV: K U/M: EA DRAWING NO: ARC-A\1009161
PWB ASSY,QUAD AMP,100S1G4

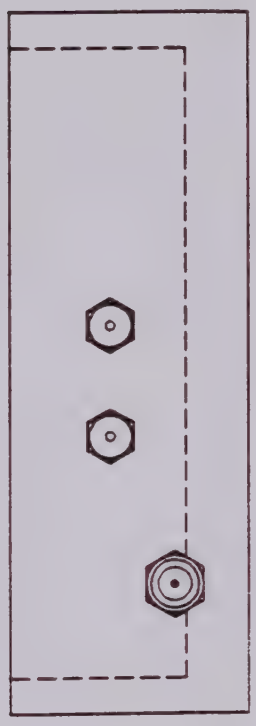
SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
2720	55647-1501F		RES,FXD,CHIP,1.5K,1%,1/8W	EA	2.000	D-K\P1.5K-FCT-ND	R3 ,R15
2730	55647-3301J		RES,FXD,CHIP,3.3K,5%,1/8W	EA	2.000	D-K\P3.3K-ECT-ND	R4 ,R8
2740	55724-2R70J		RES,FXD,WW,2.7,5%,11W	EA	2.000	OHM\90J2R7	R5 ,R16
2750	55647-6800J		RES,FXD,CHIP,680,5%,1/8W	EA	2.000	D-K\P680-ECT-ND	R6 ,R31
2760	55916		RES,VAR,CERMET,MULTITURN,TOP ADJ,500,10%,1W	EA	1.000	MEP\8024EKW-501	R7
2780	55647-4531F		RES,FXD,CHIP,4.53K,1%,1/8W	EA	2.000	D-K\P4.53K-FCT-ND	R9 ,R14
2790	55647-1101J		RES,FXD,CHIP,1.1K,5%,1/8W	EA	2.000	D-K\P1.1K-FCT-ND	R10 ,R12
2795	55647-1801J		RES,FXD,CHIP,1.8K,5%,1/8W	EA	3.000	D-K\P1.8K-ECT-ND	R11 ,R13 R27
2800	56072		RES,FXD,PRECISION,FLANGE,MOUNT,50	EA	2.000	RFP\RFP-20-50TP	R17 ,R18
2810	55647-51R0J		RES,FXD CHIP,51 OHM,1/8W,5%	EA	2.000	D-K\ P51-ECT-ND	R19 ,R20
2815	55647-1001J		RES,FXD,CHIP,1K,1/8,5%	EA	5.000	D-K\P1.0K-ECT-ND	R21 ,R22 R25 ,R26 R30
2820	55649-13R0J		RES,FXD,CHIP,13,5%,1W	EA	2.000	D-K\P13XCT-ND	R23 ,R24
2840	55647-3901J		RES,FXD,CHIP,3.9K,5%,1/8W	EA	1.000	D-K\P3.9K-ECT-ND	R28
2850	55647-5601J		RES,FXD,CHIP,5.6K,5%,1/8W	EA	1.000	D-K\P5.6K-ECT-ND	R29
3700	60033		INTEGRATED CKT,LINEAR,POS.,ADJ.V,2A	EA	1.000	SGS\L200CV	U1
3710	25046		COUPLER,90 DEG,HYBRID	EA	2.000	RFP\102-422-90-200	U2 ,U3
3720	60135		IC,LINEAR QUAD COMPARATOR,SM	EA	1.000	NSI\LM339AM	U4
4000	30043		DIODE,ZENER,4.7V,SM	EA	1.000	D-K\MA3047CT-ND	VR1
5000	1011262-101	B	PWB,QUAD AMP	EA	1.000	ARC-C\1011262	1
5010	1009165-101	A	HSG,QUAD AMP	EA	1.000	ARC-D\1009165	2
5020	1009164-101-M1	A	COVER,QUAD AMP	EA	1.000	ARC-C\1009164	3
5030	69358		CLIP,COMPNT,1.75"L,.333"W,.377"HT	EA	2.000	OHM\5908	4
5050	11166		SCREW,MACH,PAN HD,CROSS-REC,S/S,2-56 X .50	EA	8.000		6


SEE DETAIL "F"
(22 PLCS)
MAKE FROM ITEM 25
(TYP 6 PLACES)
M-M
J1
C1
C2
C4
C28
U2
ASSY9161-501
NOTE:
GATE LEAD OF Q2,Q4
IS CUT ON ANGLE
SEE DETAIL "F"
SEE DETAIL "E"
U1
R5
TRIM ALL LEADS ON
U2 AND U3 0.100 IN.
(8PLACES)
AR
DETAIL "B"
SECTION M - M
DETAIL "A"
"A"
TRIM TEFLON OF PARTS J1, AND J2
FLUSH WITH CONNECTOR BODY.
CUT CENTER PIN TO 0.075"(IN)
INSTALL CONNECTOR FLUSH WITH
INNER HOUSING WALL TIGHTEN
LOCKING NUT "A" SECURELY.
(DO NOT USE SUPPLIED WASHER)
DETAIL "F"
C32
C33
C6
C15
DETAIL "C"
NOT TO SCALE
0.25
L5,L6
BOTTOM VIEW
OF U2 & U3
SIDE VIEW
OF U2 & U3

ITEM	DATE	REV
–	10OCT99	1
REL	20OCT99	–
1034	27OCT99	A

REL NO 2031-01





NOTES:

1.0 INSTALL PWB INTO HOUSING. CENTER THE CUTOUT FOR THE FET'S OVER THE 2–56 FET MOUNTING SCREW HOLES.

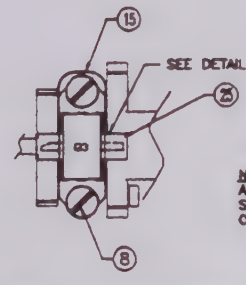
2.0 TIGHTEN ALL MOUNTING SCREWS FOR PWB BEFORE BEGINNING INSTALLATION OF COMPONENTS.

3.0 INSTALL ALL COMPONENTS INTO HOUSING BEFORE FET INSTALLATION. THIS MUST BE DONE LAST.

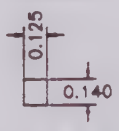
CAUTION

4.0 THE FET INSTALLATION MUST BE DONE AT A STATIC APPROVED WORK STATION. PERSONS HANDLING AND INSTALLING THE FET'S MUST BE FAMILIAR WITH GaAs FET HANDLING PROCEDURES. THE GaAs FET CAN BE DESTROYED, ELECTRICALLY AND MECHANICALLY.

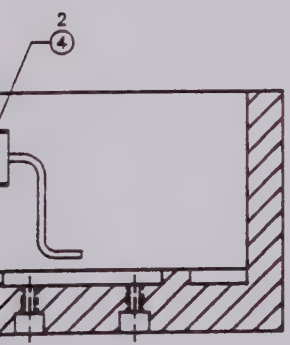
5.0 DO NOT PUSH THE GATE OR DRAIN LEADS DOWN TO THE P.C. BOARD WHEN INSTALLING THE FET. USE SOLDER TO FILL THE AREA BETWEEN THE LEAD AND THE P.C.BOARD.



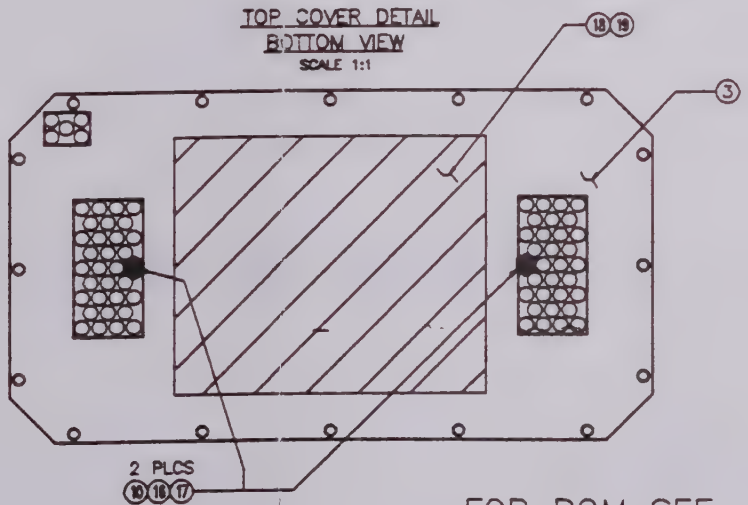
DETAIL "E"



NOTE:
ADD PIECE OF ITEM 25 (0.003 THK BRASS SHIM STOCK) TINNED ON BOTH SIDES TO TOP OF THE GATE AND DRAIN LEADS OF Q3,Q4.



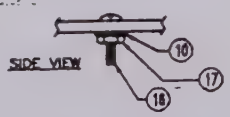
TOP COVER DETAIL
BOTTOM VIEW
SCALE 1:1



FOR BOM SEE: 1010886–501

TES:
ALL TANT. CAP ON TOP OF CHIP CAPS SHOWN. KEEPING LEADS AS SHORT AS SIBLE. (SIDE VIEW)

DETAIL "D"
NOT TO SCALE



ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED DO NOT SCALE DRAWING DIMENSIONS ARE IN INCHES AND SURFACE FINISH THEREOF ALL TOLERANCES ARE EITHER DECIMAL OR FRACTIONAL CLASS 2 MACHINE ALL BURRS AND SHARP EDGES

DECIMAL DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.03	±.005
ABOVE 6 TO 24	±.05	±.010
ABOVE 24	±.06	±.015

ANGULAR DIMENSIONS ±2°

USED ON MODEL
120S1G3
30S1G3
60S1G3

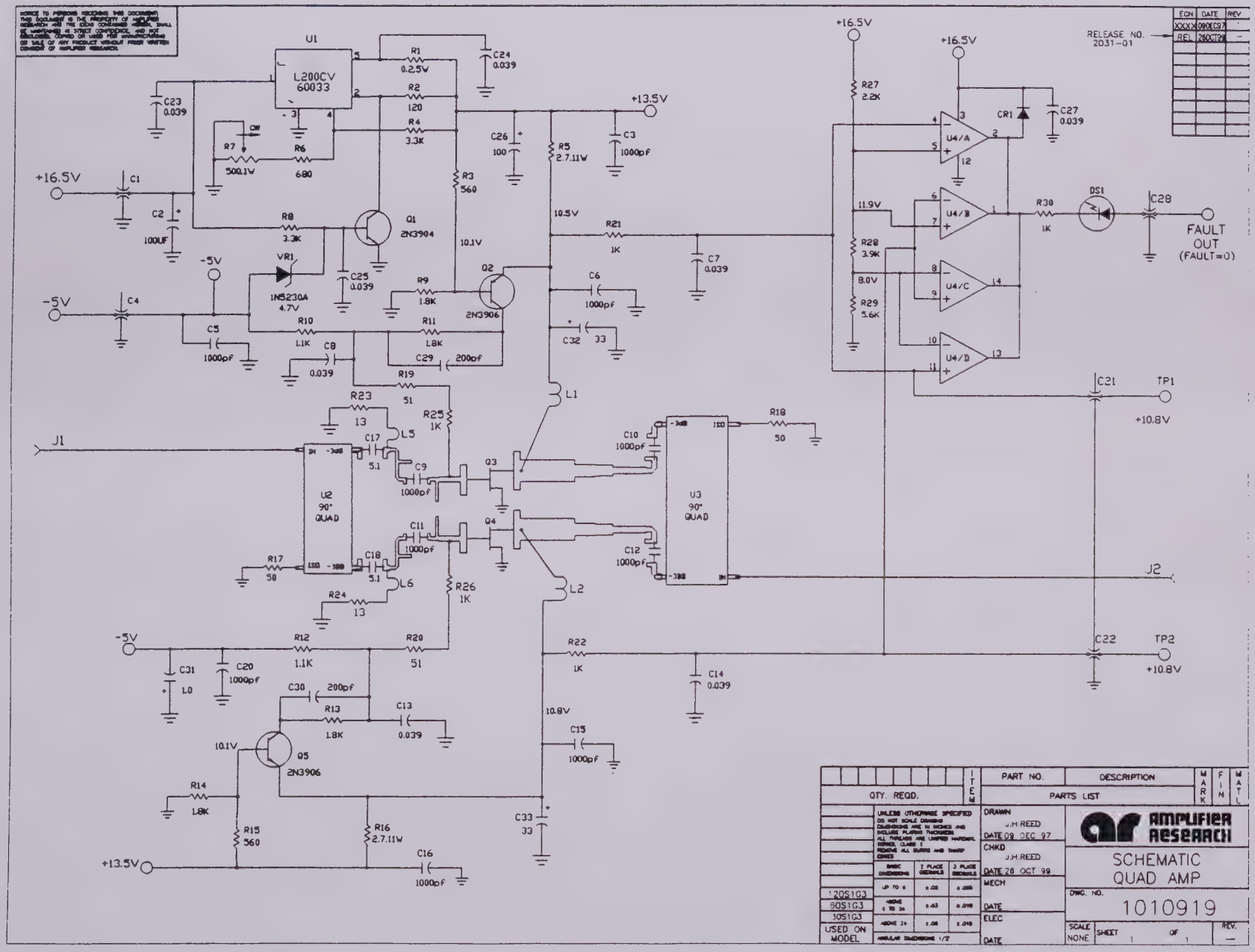
DRAWN J.REED DATE 19 OCT 99
CHKD J.REED DATE 19 OCT 99
MECH J.MAGINN DATE 27 OCT 99
ELEC F.SCHWK DATE 27 OCT 99

AMPLIFIER RESEARCH

ASSEMBLY
QUAD AMP

DWG. NO. 1010886

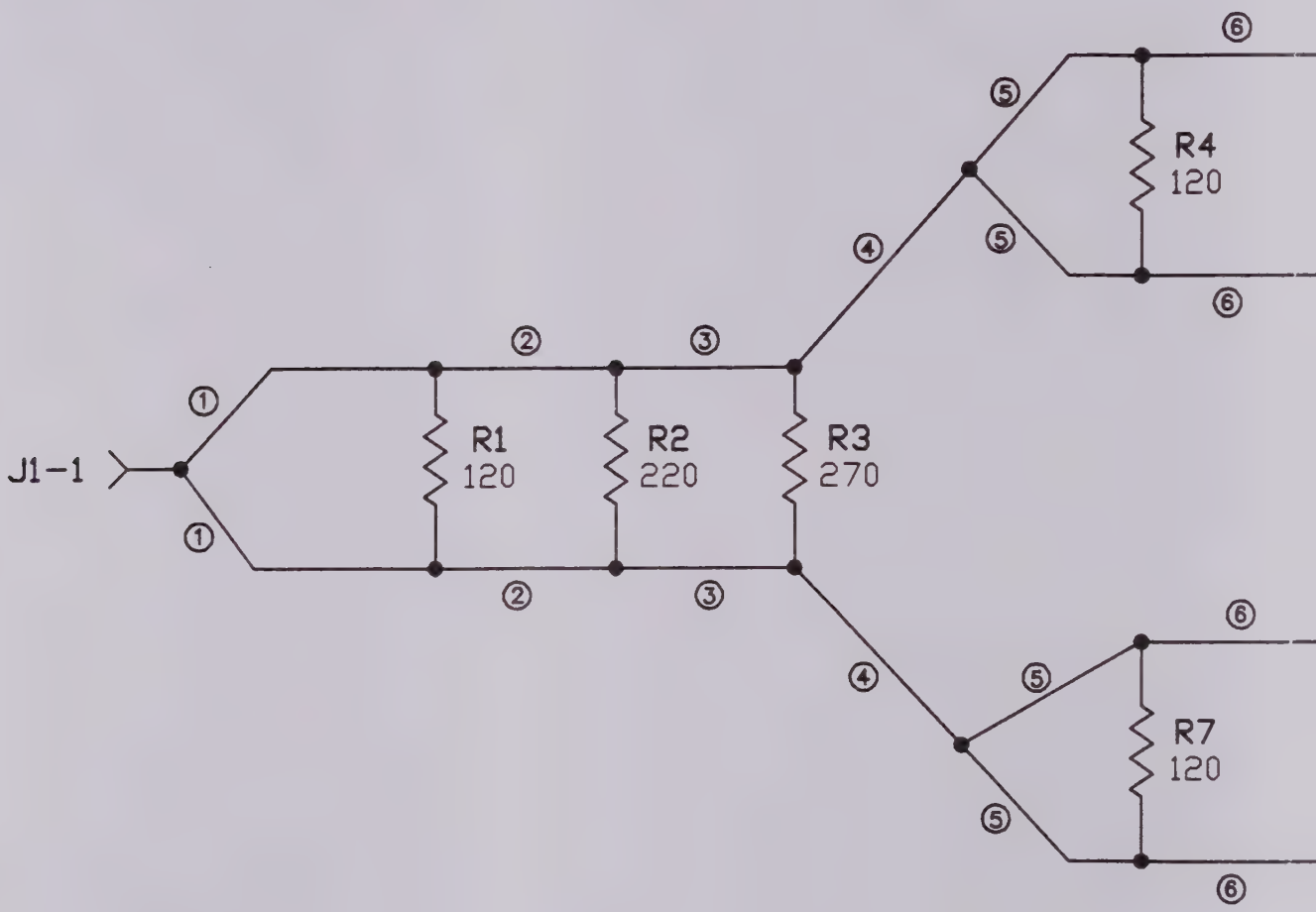
SCALE NONE SHEET 1 OF 1 REV. A


L200CV 60033
U1
+16.5V
-5V
+13.5V
+10.8V
Q1 2N3904
Q2 2N3906
Q3
Q4
Q5 2N3906
VR1 1N5230A 4.7V
U2 90° QUAD
U3 90° QUAD
U4/A
U4/B
U4/C
U4/D
CR1
DS1
FAULT OUT (FAULT=0)
TP1
TP2
J1
J2
L1
L2
L3
L4
L5
L6
RELEASE NO. 2031-01
ECN
DATE
REV
PART NO.
DESCRIPTION
PARTS LIST
QTY. REQD.
ITEM
MARK
FIN
MATL
DRAWN
J.H.REED
DATE 09 DEC 97
CHKD
J.H.REED
DATE 28 OCT 99
MECH
DATE
ELEC
DATE
USED ON MODEL
120S1G3
80S1G3
30S1G3
AMPLIFIER RESEARCH
SCHEMATIC
QUAD AMP
DWG. NO.
1010919
SCALE
NONE
SHEET
OF
REV.

BILL NO: 1009161-501 REV: K U/M: EA DRAWING NO: ARC-A\1009161
PWB ASSY,QUAD AMP,100S1G4

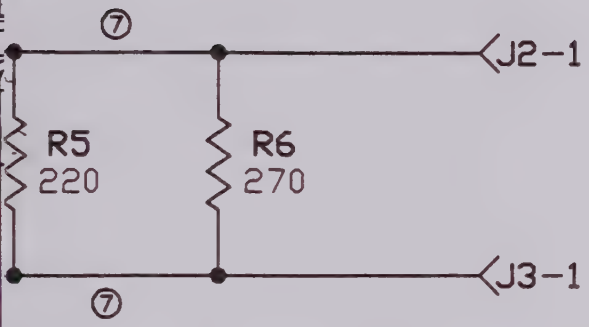
SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
5060	12005		WASH,LOCK,SPLIT,S/S,#2	EA	8.000	\MS35338-134	7
5070	11084		SCREW,MACH,PAN HD,CROSS-REC,S/S,2-56 X .18	EA	8.000	\MS51957-2	8
5080	11202		SEM,MACH SCREW,PHP W/SPLIT LK WASH,S.S.,4-40x.25	EA	41.000		9
5090	12047		WASH,LOCK,SPLIT,S/S,#4	EA	2.000	\MS35338-135	10
5100	12010		WASH,FLAT,S/S,#4,.250 OD X .125 ID X .022 THK	EA	23.000	\MS15795-803	11
5120	1007919-101	A	SHIELD,RF	EA	4.000	ARC-B\1007919	13
5130	69338		CONTACT,FINGER STOCK,TWIST GASKET,TIN PL	IN A/R		I-S\OSG8-0559-17	14
5140	77064		COMPOUND,THERMAL JOINT,TYPE 120	OZ A/R		WAK\120-S	15
5150	11095		SCREW,MACH,PAN HD,CROSS-REC,S/S,4-40 X .62	EA	2.000	\MS51957-18	16
5160	13013		NUT,HEX,S/S,4-40,.250AF	EA	2.000	\MS35649-244	17
5170	69332		FOAM,CONDUCTIVE	IN A/R		MMM\2802	18
5180	77066		ADH,RTV,SELF-LVL,CLEAR	OZ A/R		G-E\GE118	19
5190	66027		WIRE,TFE,22 AWG,STRANDED,TYPE E,RED	EA A/R			20
5200	66031		WIRE,TFE,22 AWG,STRANDED,TYPE E,BLU	EA A/R			21
5210	66032		WIRE,TFE,22 AWG,STRANDED,TYPE E,VIO	EA A/R			22
5220	66034		WIRE,TFE,22 AWG,STRANDED,TYPE E,WHT	EA A/R			23
5230	1000643-403	C	CORE,FERRITE,BEAD,1/2 CMD5005	EA	9.000	ARC\1000643	24
5240	1011205-101	-	SHIM	EA	4.000	ARC-B\1011205	25
5250	66079		WIRE,TFE,22 AWG,STRANDED,TYPE E,WHT/RED	IN A/R			26
5260	69319		CABLE TIES, 0.6 MAX BUNDLE DIA,2.8 L	EA	4.000	PNT\PLT.65MC	27

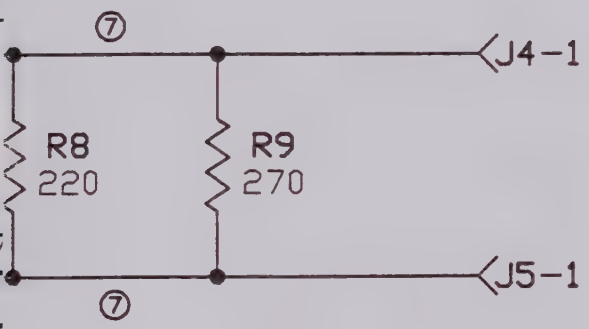
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ECN	DATE	REV
XXXX	13NOV98	1
REL	28MAY99	–

REL. NO. 1196-03 →





ITEM	PART NO.	DESCRIPTION	MARK	FIN	MATL
QTY. REQD.	PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015

ANGULAR DIMENSIONS 1/2°

100S1G4
USED ON MODEL

DRAWN J.H.REED DATE 10 NOV 98
CHKD J.H.REED DATE 28 MAY 99
MECH DATE
ELEC DATE

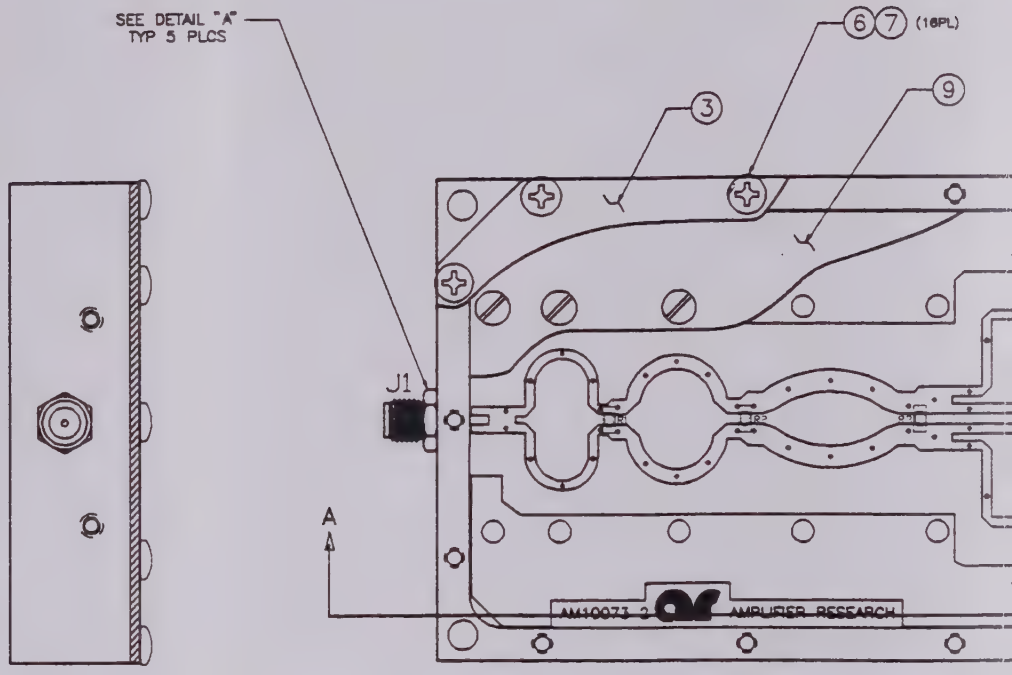
AMPLIFIER RESEARCH

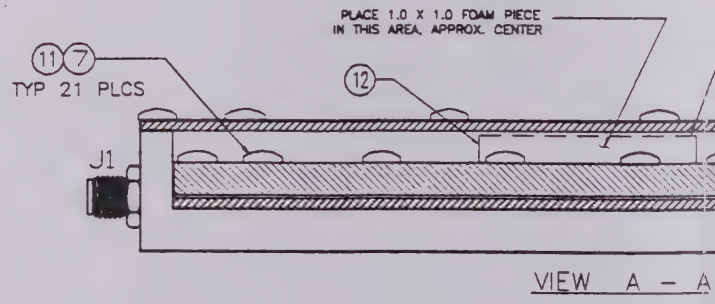
SCHEMATIC 4 WAY SPLITTER #3

DWG. NO. 1010074

SCALE	SHEET	OF	REV.
NONE	1	1	—

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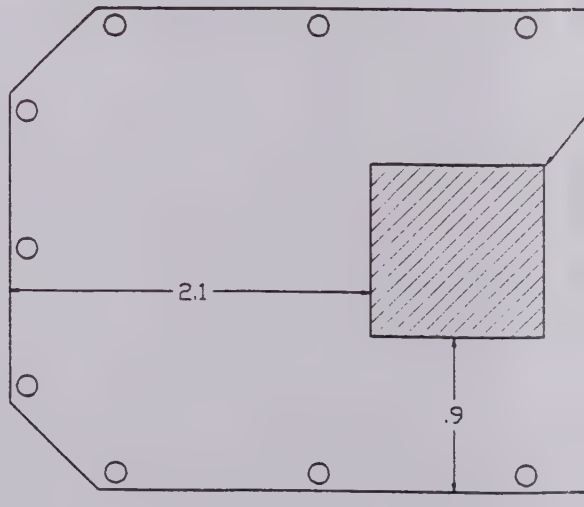


VIEW A – A

DETAIL "A"



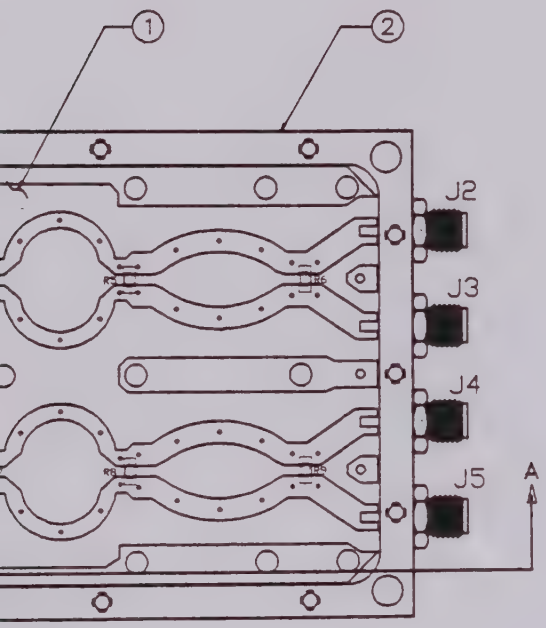
TRIM TEFLON OF PARTS J1,J2,J3,J4,
AND J5, FLUSH WITH CONNECTOR BODY.
CUT CENTER PIN TO 0.075"(IN)
INSTALL CONNECTOR FLUSH WITH
INNER HOUSING WALL. TIGHTEN
LOCKING NUT SECURELY.
(DO NOT USE SUPPLIED WASHER)

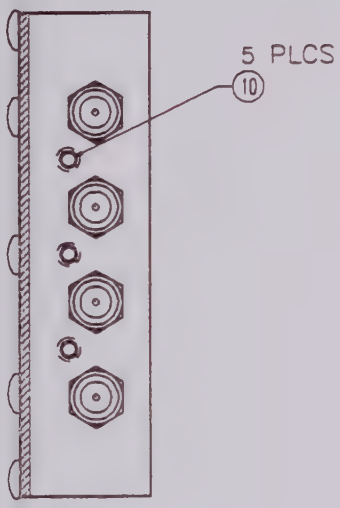


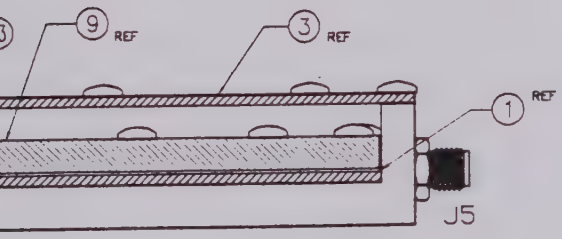
NOTES:

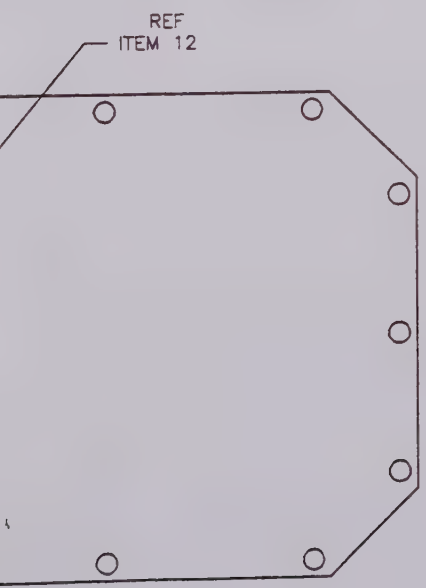
1. INSTALL CONNECTORS (J1 THRU J5) ONTO HOUSING (ITEM 2).
2. INSTALL RESISTORS (R1 THRU R9) TO PWB (ITEM 1), THEN INSTALL PWB INTO HOUSING (ITEM 2) TEMPORAILY USING MTG HARDWARE (ITEMS 6 AND 7). CONN END'S ONLY.
3. SOLDER CENTER PINS OF CONECTORS (J1 THRU J5) TO PWB. REMOVE MTG HARDWARE AFTER SOLDERING IS COMPLETE.
4. INSTALL INNER LID (ITEM 9) INTO HOUSING USING MTG HARDWARE (ITEMS 7, & 11).
5. INSTALL SET SCREWS (ITEM 10), INTO HOUSING 5 PLACES, TIGHTEN SECURELY.
6. INSTALL FOAM PIECE (ITEM 12), APPROX. WHERE SHOWN. APPLY RTV SEALANT P/N 77065 TO FOAM, ITEM 12. SECURE TO COVER LOCATED APPROX. AS SHOWN. CURE AT AMBIENT FOR 24 HRS.
7. PUT ALL MTG. HARDWARE (ITEMS 6 AND 7) IN TOP COVER. COVER WILL NOT BE REMOVED ONCE IT IS PLACED ON HOUSING.

ECN	DATE	REV
XXXX	04NOV98	1
XXXX	17DEC98	2
XXXX	01APR99	3
XXXX	14MAY99	4
RELEASE NO. 1196-03	28MAY99	–
102201	10CT99	A









COVER
BOTTOM VIEW

FOR BOM, SEE 1010072-501

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	± .02	± .005
ABOVE 6 TO 24	± .03	± .010
ABOVE 24	± .06	± .015
ANGULAR DIMENSIONS ± 2°		

DRAWN	J.H.REED
DATE	04 NOV 98
CHKD	J.H.REED
DATE	28 MAY 99
MECH	J.MAGINN
DATE	16 JUNE 99
ELEC	F.SCHIRK
DATE	02 JUNE 99

AMPLIFIER RESEARCH

ASSEMBLY DRAWING
4 WAY SPLITTER

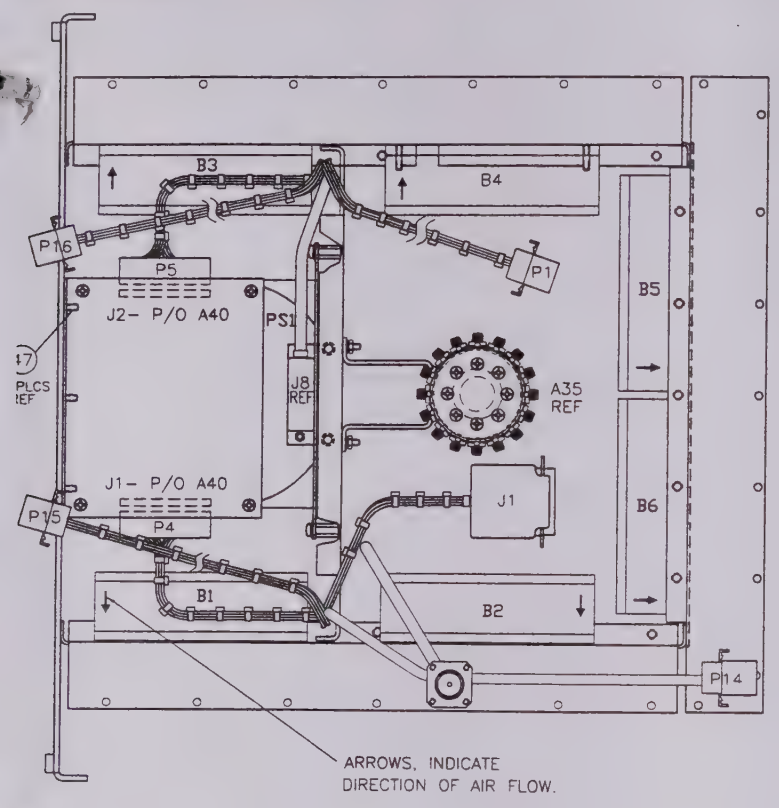
DWG. NO. 1010072

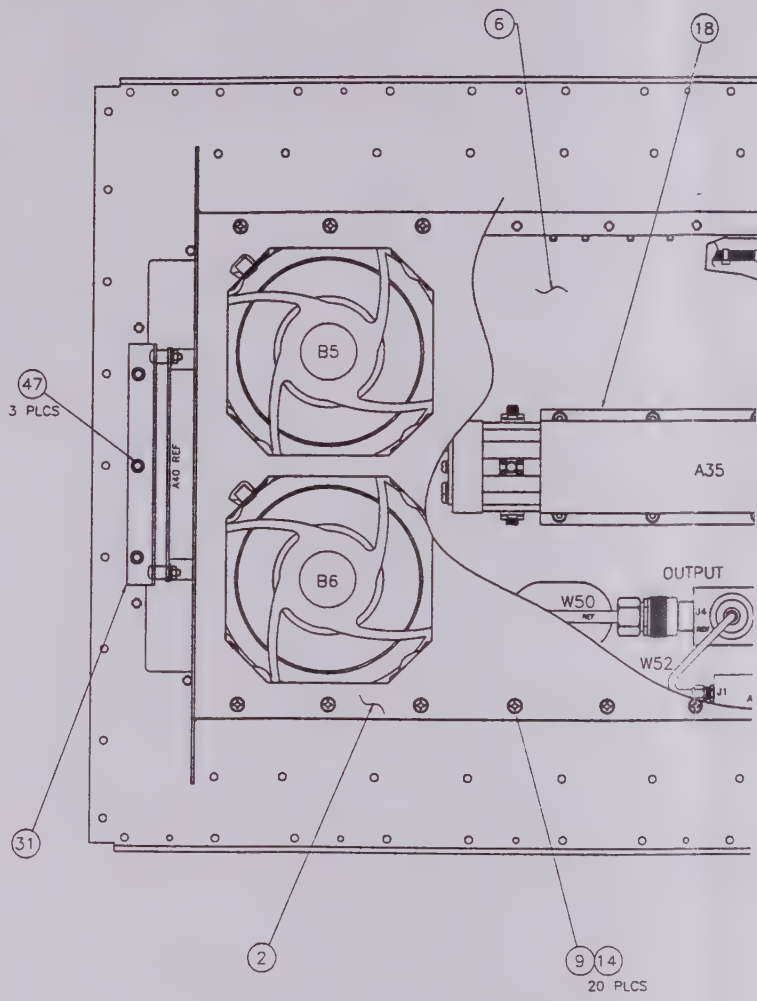
100S1G4	SCALE 2/1	SHEET 1 OF 1	REV. A
USED ON MODEL			

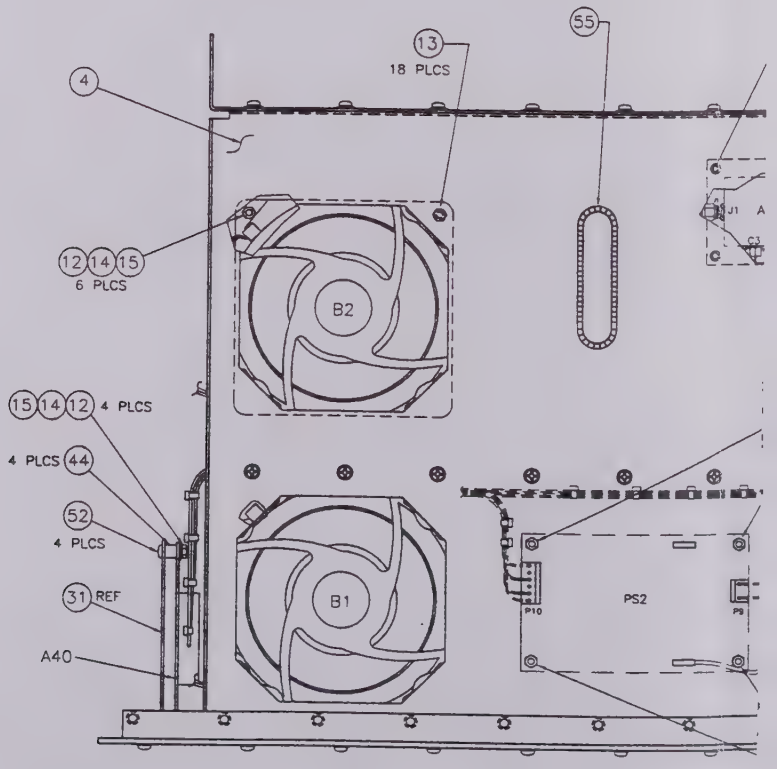
BILL NO: 1010072-501 REV: A U/M: EA DRAWING NO: ARC-D\1010072
PWB ASSY,4 WAY SPLITTER #3

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1010072	A	ASSY DWG,4 WAY SPLITTER #3	EA	REF	ARC-D\1010072	
0020	1010074	-	SCHEM DIAG,4 WAY SPLITTER #3	EA	REF	ARC-B\1010074	
1500	41243		CONN,COAX,BULKHD JACK,SMA,(F)	EA	5.000	DTA\1321000K82165	J1 ,J2 J3 ,J4 J5
2700	55651-1200J		RES,FXD,CHIP,120,5%,1/4W	EA	3.000	D-K\P120VCT-ND	R1 ,R4 R7
2710	55651-2200J		RES,FXD,CHIP,220,5%,1/4W	EA	3.000	D-K\P220VCT-ND	R2 ,R5 R8
2720	55651-2700J		RES,FXD,CHIP,270,5%,1/4W	EA	3.000	D-K\P270VCT-ND	R3 ,R6 R9
5000	1010073-101	A	PWB,4 WAY SPLITTER #3	EA	1.000	ARC-B\1010073	1
5010	1010075-101	-	HSG,4 WAY SPLITTER #3	EA	1.000	ARC-B\1010075	2
5020	1008122-101	-	COVER,4 WAY SPLITTER	EA	1.000	ARC-B\1008122	3
5040	11010		SCREW,MACH,PAN HD,CROSS-REC,S/S,4-40 X .25	EA	16.000	\MS51957-13	6
5050	12047		WASH,LOCK,SPLIT,S/S,#4	EA	37.000	\MS35338-135	7
5070	1010076-101	-	LID,INNER,4 WAY SPLITTER #3	EA	1.000	ARC-B\1010076	9
5080	11183		SET SCREW,HEX SOCKET,CUP PT,S/S,6-32 X .19	EA	5.000		10
5090	11011		SCREW,MACH,PAN HD,CROSS-REC,S/S,4-40 X .38	EA	21.000	\MS51957-15	11
5100	69332		FOAM,CONDUCTIVE	IN	A/R	MMM\2802	12
5110	77065		SEALANT,RTV,FLUOROSILE	OZ	A/R	G-E\730 RTV	13

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SALE OF ANY PRODUCT WITHOUT PRIOR WRITTEN
SENT OF AMPLIFIER RESEARCH.

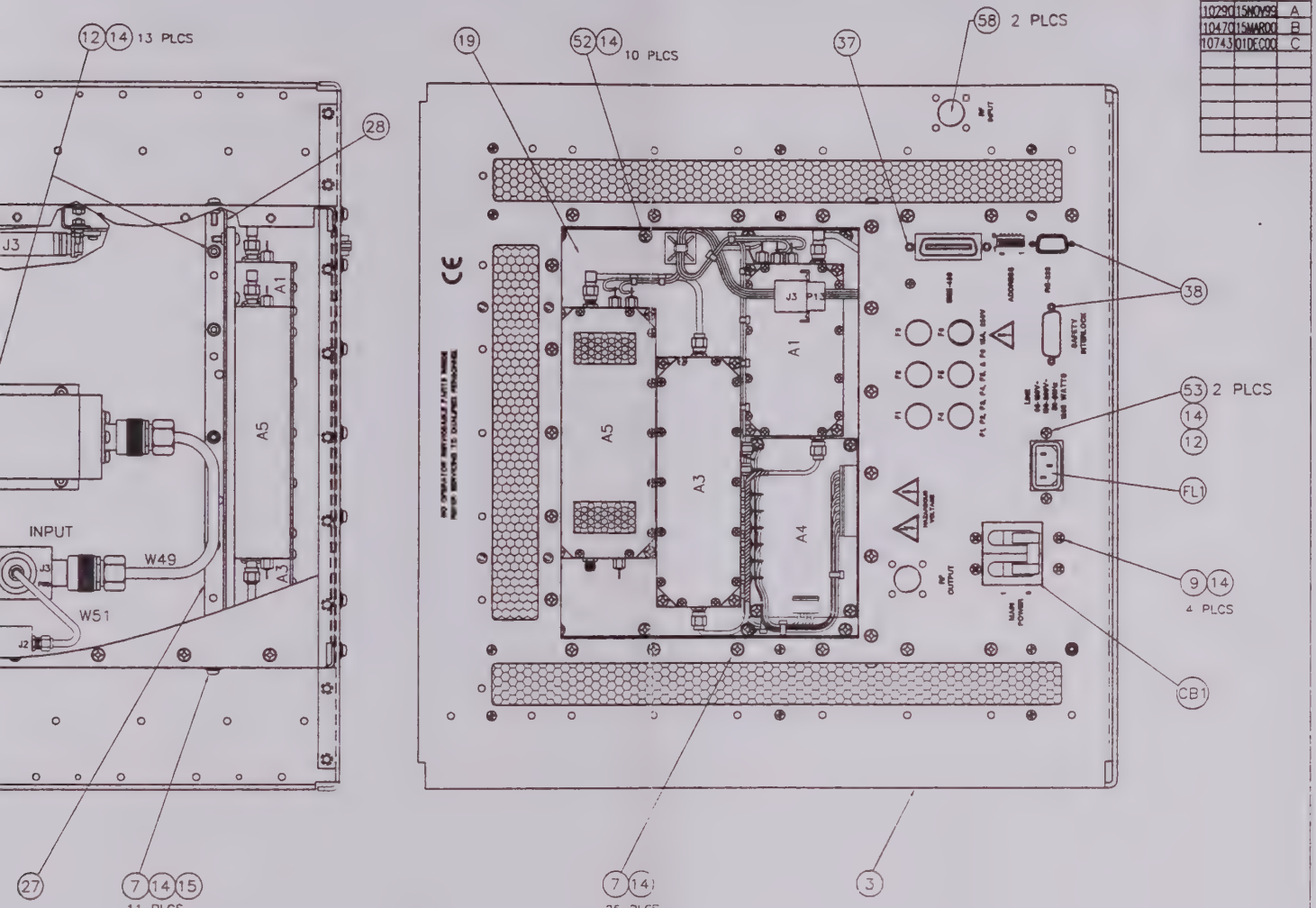


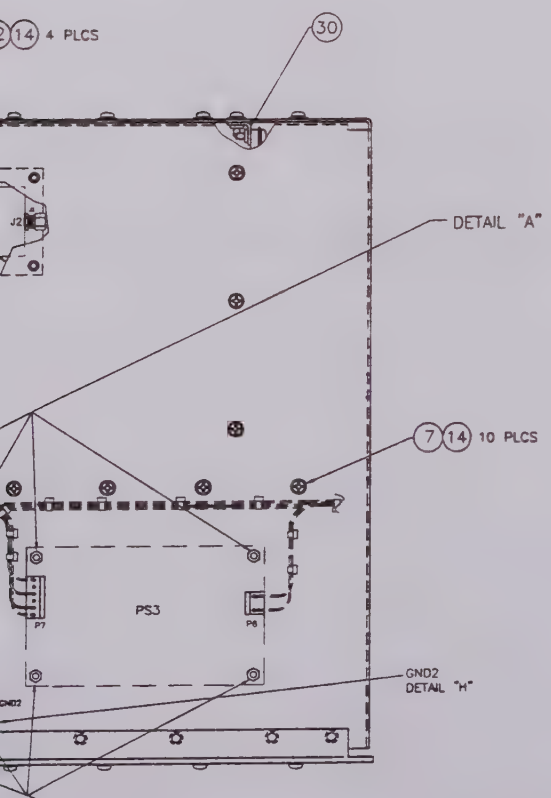


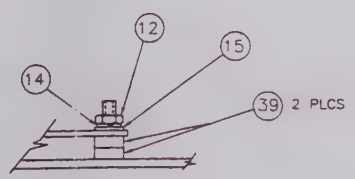


REL NO.1196-03

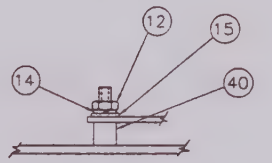
ECN	DATE	REV
REL	26MAY99	—
10290	15NOV99	A
10470	15MAR00	B
10743	01DEC00	C







DETAIL "A"
SCALE 2:1



DETAIL "B"
SCALE 2:1

SHEET	1	2
REV	C	C

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015

ANGULAR DIMENSIONS 1/2

100S1G4
USED ON MODEL

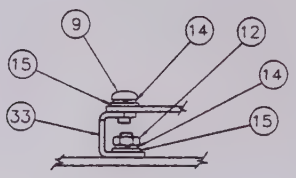
DRAWN A.REED DATE 5/5/98
CHKD A.REED DATE 26 MAY 99
MECH J.MAGINN DATE 16 JUNE 99
ELEC F.SCHIRK DATE 15 JUNE 99

AMPLIFIER RESEARCH

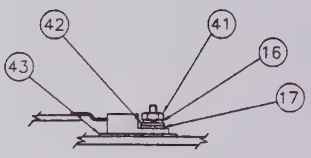
ASSEMBLY DRAWING
POWER SUPPLY

DWG. NO. 1009470

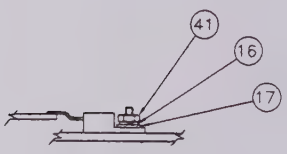
SCALE 1/2 SHEET 1 OF 2 REV. C



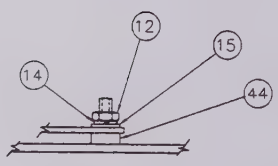
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SCALE 2:1



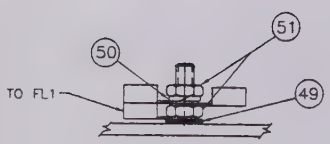
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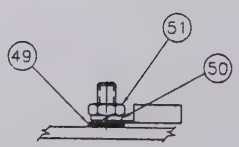
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SCALE 2:1



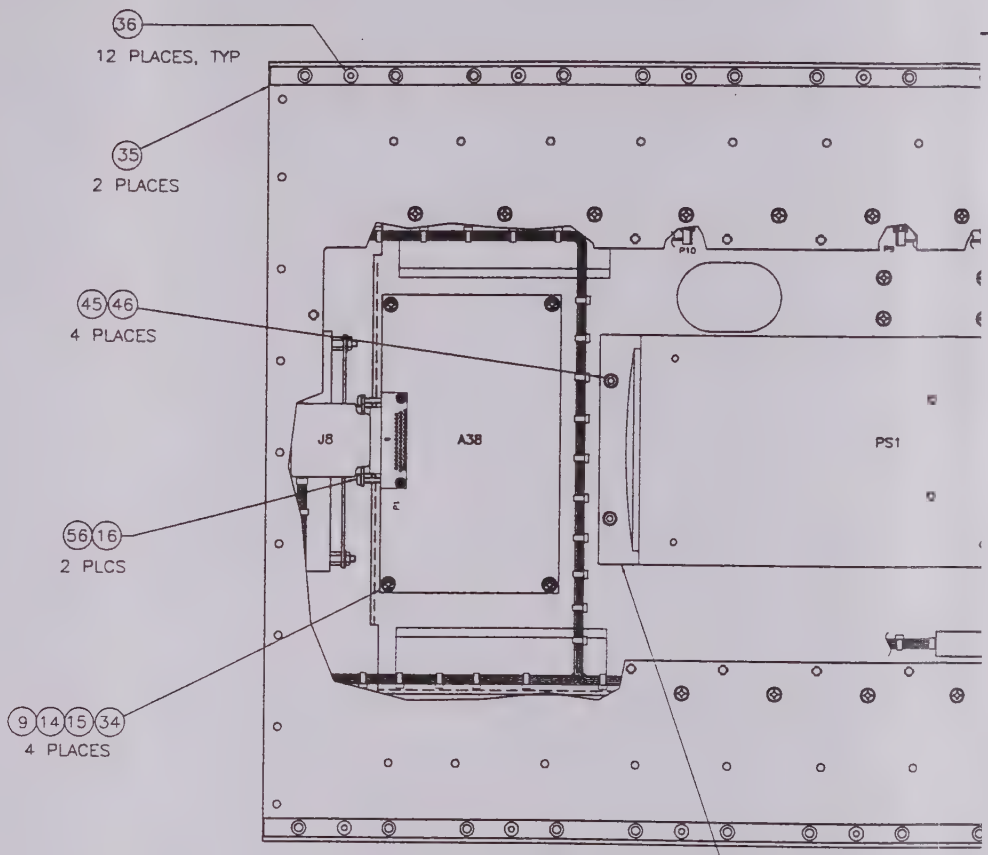
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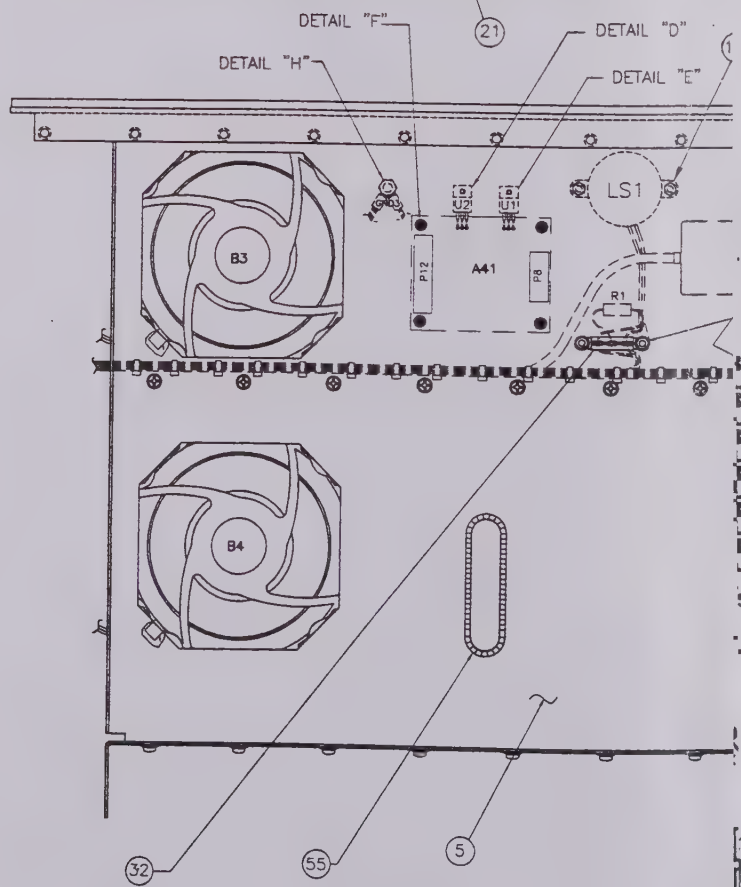


DETAIL "G"
SCALE 2:1



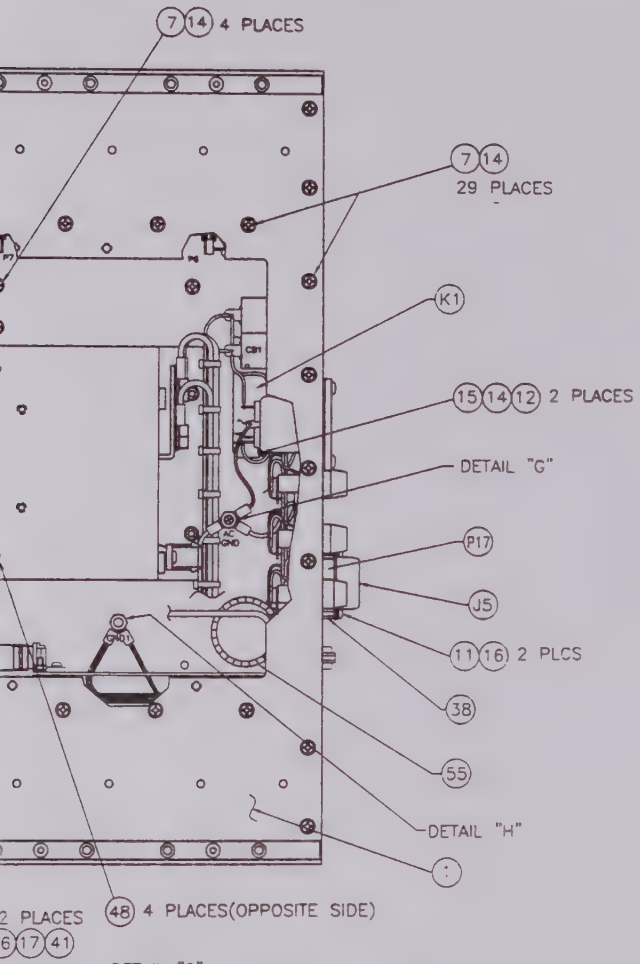
DETAIL "H"
SCALE 2:1

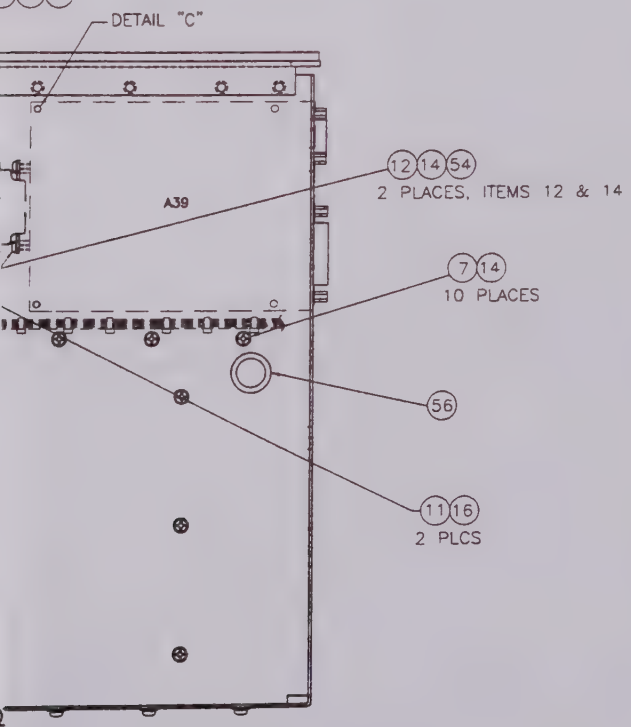




REL NO.1196-03

ECN	DATE	REV
REL	26MAY99	–
10290	15NOV99	A
10470	15MAR00	B
10743	01DEC00	C





NOTES:

1.0 COVER, TOP INNER CHASSIS (ITEM 2)– INSTALL FANS (B5 & B6). INSTALL ANGLE, TOP SUPPORT(ITEM 30), DO NOT TIGHTEN.

2.0 PANEL, RIGHT SIDE, INNER CHASSIS (ITEM 4)– INSTALL FANS (B1 & B2). INSTALL PS2 & PS3 (DETAILS A & B), INSTALL ALLIGATOR STRIP. INSTALL ANGLE, R/S SUPPORT (ITEM 29), DO NOT TIGHTEN.

3.0 PANEL, LEFT SIDE, INNER CHASSIS (ITEM 5)– INSTALL FANS (B3 & B4). INSTALL REGULATOR ASSY (A41) AND U1 & U2 (DETAILS E & D). INSTALL LS1, TERMINAL STRIP (ITEM 32), R1, AND SOLDER LUG (ITEM 54). INSTALL ALLIGATOR STRIP (ITEM 55) AND GROMMET (ITEM 56). INSTALL ANGLE L/S SUPPORT (ITEM 28), DO NOT TIGHTEN.

4.0 REAR PANEL (ITEM 3)– CLEAR ALL HOLES FOR MOUNTING SCREWS. INSTALL XF1 THRU XF6, CB1, FL1, P17, J5 (W/ SWITCHING SHELL) AND HOLE PLUGS (ITEM 58).

5.0 PANEL, INNER CHASSIS (ITEM 6)– INSTALL ALLIGATOR STRIP IN ACCESS HOLE TO LO LEVEL AMP AS SHOWN. INSTALL K1, MOUNT PS1 TO PLATE (ITEM 21) AND INSTALL IN CHASSIS. INSTALL ALC BD ASSY (A38).

6.0 INSTALL POWER SUPPLY HARNESS ASSY (ITEM 20) ONTO INNER CHASSIS. INSTALL INNER CHASSIS PORTION OF AC POWER HARNESS. INSTALL REMAINING PORTION OF AC HARNESS TO REAR PANEL ASSY AND COMPLETE CONNECTION TO INNER CHASSIS FROM REAR PANEL. COMPLETE INTALLATION OF POWER SUPPLY HARNESS TO REAR PANEL (FUSES AND P17). ATTACH REAR PANEL TO INNER CHASSIS.

7.0 INSTALL RIGHT PANEL TO CHASSIS ASSY. COMPLETE CONNECTIONS TO PS2, PS3, AND GND 2. ROUTE COAX WIRES FROM HARNESS TO PWB ASSY, DETECTOR BOARD, INSTALL AND MOUNT TO CHASSIS. THEN, INSTALL COUPLER, DUAL DIRECTIONAL TO INNER CHASSIS AND CONNECT CABLE ASSY'S W51 AND W52 (DIRECTIONAL DETECTOR ASSY IS NOW COMPLETE).

8.0 INSTALL 16-WAY COMBINER (A35) ONTO BRACKET (ITEM 18) AND ATTACH TO INNER CHASSIS. INSTALL CABLE W49 (TIGHTEN SECURELY).

9.0 INSTALL LEFT PANEL TO CHASSIS ASSY. COMPLETE CONNECTIONS TO A41, TERMINAL STRIP AND GND 3. MOUNT J3 OF EXTENSION CABLE TO REMOTE INTERFACE (A39). INSTALL A39 ASSY INTO LEFT AND REAR PANEL. INSTALL U2 (CONTROLLER), IF SUPPLIED.

10. INSTALL LO LEVEL AMP (ITEM 19) TO SUPPORTS (ITEMS 27, 28 & 29). INSTALL TOP COVER ASSY AND ATTACH ITEM 19 TO ITEM 30. TIGHTEN LO LEVEL AMP SCREWS AND THEN SCREWS TO INNER CHASSIS.

11. INSTALL BOTTOM COVER (ITEM 1), DO NOT INSTALL GLIDES (ITEM 35) TO BE INSTALLED IN TEST.

12. INSTALL FAULT DETECTOE BD (A40) ONTO BRACKET (ITEM 31) AND ATTACH ASSY TO BOTTOM COVER.

13. FOR CABLE INFORMATION SEE DIAGRAM #1009097.

14. FOR INTERWIRING INFORMATION SEE DWG. #1009611.

DWG. NO.			
1009470			
SCALE 1/2	SHEET 2	OF 2	REV C

BILL NO: 1009470-501 REV: H U/M: EA DRAWING NO: ARC-D\1009470
PWR SUPPLY/COMBINER ASSY

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1009470	C	ASSY DWG,PWR SUPPLY ASSY,100S1G4	EA	REF	ARC-D\1009470	
0100	1009356-501	C	ASSY,16 WAY COMBINER	EA	1.000	ARC-A\1009356	A35
0110	1009467-501	-	DIRECTIONAL DETR ASSY	EA	1.000	ARC-D\1009467	A36
0115	1009957-501	B	ALC BD ASSY	EA	1.000	ARC-C\1009957	A38
0120	1009892-501	D	PWB ASSY,REMOTE INTERFACE	EA	1.000	ARC-C\1009892	A39
0130	1009582-501	-	PWB ASSY,FAULT DETECT BD/100S1G4	EA	1.000	ARC-A\1009582	A40
0140	1009718-501	A	PWB ASSY,REGULATOR BD/100S1G4	EA	1.000	ARC-A\1009718	A41
0150	60045		INTEGRATED CKT,3 TERM,POS REG.	EA	1.000	MOT\MC7805CT	A41U1
0160	60066		IC,3 TERM,NEG REG	EA	1.000	MOT\MC7905CT	A41U2
0200	37020	-	FAN,AXIAL,24 VDC,106 CFM,	EA	6.000	PAM\4124KX	B1 ,B2 B3 ,B4 B5 ,B6
0600	35010		CKT BRKR,2 POLE,15A,220VAC	EA	1.000	HEI\AM2-A3-A-15-2	CB1
1300	35041		FUSE,NORMAL BLO,CER BODY,15A,250V	EA	6.000	LIF\314015	F1 ,F2 F3 ,F4 F5 ,F6
1400	35020		FILT,LINE,15 AMP	EA	1.000	SPR\15JX5451A	FL1
1700	43046		RELAY,MED PWR,12VDC COIL,30A CONTACT RATING	EA	1.000	DIGIKEY\PB298-ND	K1
1800	25033		BUZZER,ALARM-PULSING	EA	1.000	R-S\273-066	LS1
2400	25079		PS,SWNG,15V,1200W,PFC,85-265VAC	EA	1.000	AST\VS1-D4-00-CE	PS1
2410	25037		PS,SWNG,24V @ 1.6A	EA	1.000	CPI\NFS40-7624	PS2
2420	25080		PS,SWNG,65W,+15V,-15V,+5V	EA	1.000	CPI\NLP-7610	PS3
2700	55514-51R0J		RES,FXD,CARBON COMP,51,5%,1W	EA	1.000	A-B\GB5105	R1
4200	1010018-501	A	CABLE ASSY,COAX,SEMI-RIGID,N PLUG,N PLUG,8.5"	EA	1.000	ARC-C\1010018	W49
4500	73024		FUSEHOLDER,PNL MNT,3AG,UL 20A/300V,VDE 10A/250V	EA	6.000	LIF\345603	XF1 ,XF2 XF3 ,XF4 XF5 ,XF6

BILL NO: 1009470-501 REV: H U/M: EA DRAWING NO: ARC-D\1009470
PWR SUPPLY/COMBINER ASSY

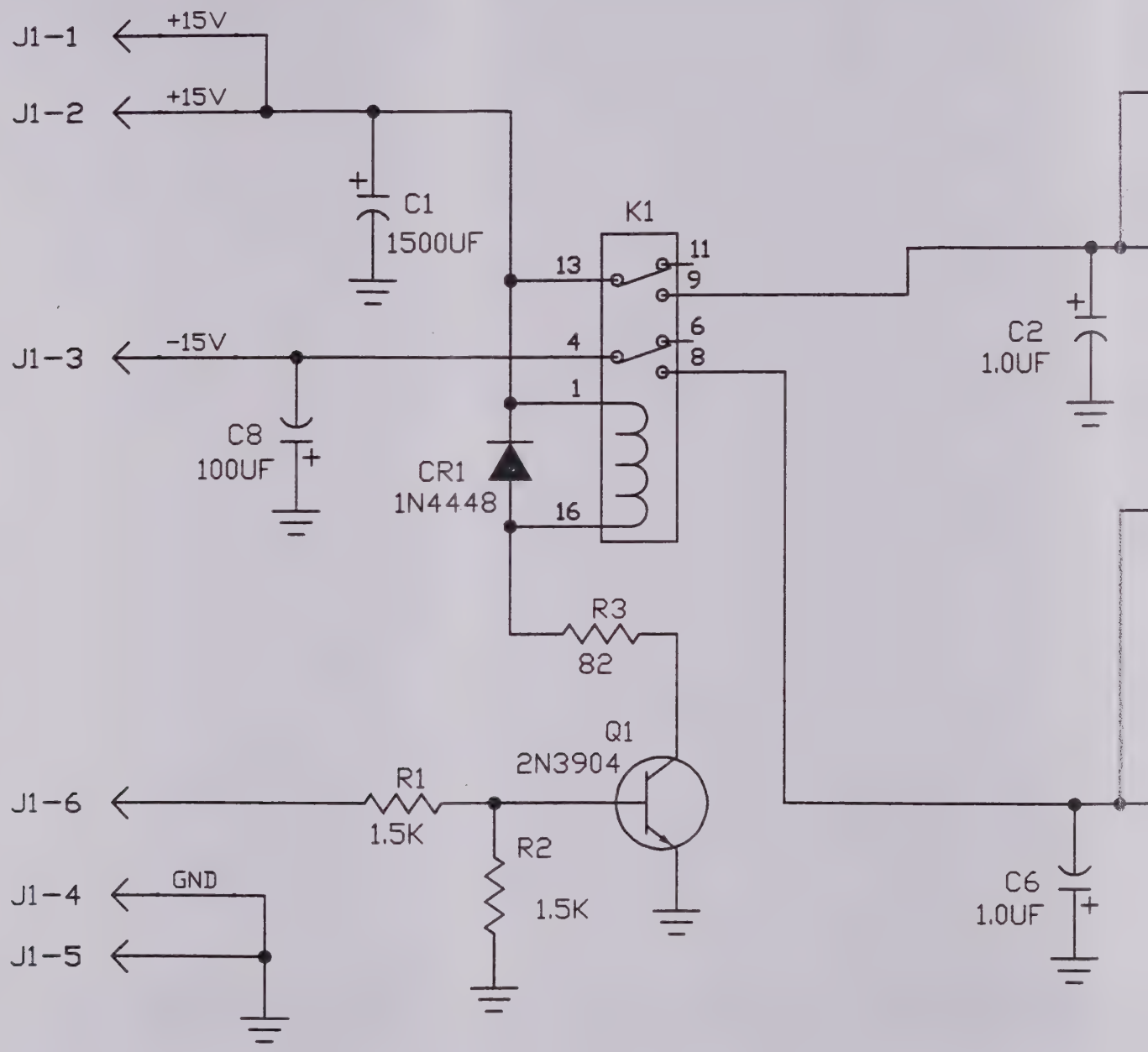
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5010	1009349-301	A	COVER,TOP INNER CHASSIS	EA	1.000	ARC-D\1009349	2
5020	1009465-301-M1	A	PNL,REAR,100S1G4	EA	1.000	ARC-D\1009465	3
5030	1009342-301	B	PNL,R/S,INNER CHASSIS	EA	1.000	ARC-D\1009342	4
5040	1009343-301	C	PNL,L/S,INNER CHASSIS	EA	1.000	ARC-D\1009343	5
5050	1009344-301	B	PNL,INNER CHASSIS	EA	1.000	ARC-D\1009344	6
5060	11016		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X .38	EA	44.000	\MS51957-28	7
5070	11028		SCREW,MACH,PAN HD,CROSS-REC,S/S,8-32 X .38	EA	4.000	\MS51957-43	8
5080	11014		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X .25	EA	44.000	\MS51957-26	9
5090	11011		SCREW,MACH,PAN HD,CROSS-REC,S/S,4-40 X .38	EA	4.000	\MS51957-15	10
5100	11010		SCREW,MACH,PAN HD,CROSS-REC,S/S,4-40 X .25	EA	6.000	\MS51957-13	11
5110	13004		NUT,HEX,S/S,6-32,.250AF	EA	12.000		12
5120	13025		NUT,SELF-LOCK,HEX,REG HT,NYLON INSERT,S/S,6-32	EA	18.000	\MS21044C06	13
5130	12048		WASH,LOCK,SPLIT,S/S,#6	EA	92.000	\MS35338-136	14
5140	12011		WASH,FLAT,S/S,#6,.312 OD X .156 ID X .035 THK	EA	92.000	\MS15795-805	15
5150	12047		WASH,LOCK,SPLIT,S/S,#4	EA	8.000	\MS35338-135	16
5160	12010		WASH,FLAT,S/S,#4,.250 OD X .125 ID X .022 THK	EA	4.000	\MS15795-803	17
5170	1009355-101	-	BRKT,COMBINER	EA	1.000	ARC-C\1009355	18
5180	1009352-501	C	ASSY,LO LVL AMP	EA	1.000	ARC-C\1009352	19
5190	1010019-501	F	HARNESS ASSY,PS,100S1G4	EA	1.000		20
5200	1009612-101	-	PL,MTG,PWR SUPPLY	EA	1.000	ARC-C\1009612	21
5260	1009545-301	-	ANGLE,BOTTOM SUPPORT	EA	1.000	ARC-B\1009545	27
5270	1009547-301	-	ANGLE,L/S SUPPORT	EA	1.000	ARC-B\1009547	28
5280	1009959-301	-	ANGLE,R/S SUPPORT	EA	1.000	ARC-B\1009959	29

BILL NO: 1009470-501 REV: H U/M: EA DRAWING NO: ARC-D\1009470
PWR SUPPLY/COMBINER ASSY

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
5290	1009610-301	-	ANGLE,TOP SUPPORT	EA	1.000	ARC-B\1009610	30
5300	1010028-301	-	BRACKET,MTG,FAULT DETECTOR	EA	1.000	ARC-C\1010028	31
5310	53005		TERM STRIP,3 TERMINAL	EA	1.000	SPC\LTS-203	32
5320	1010030-101	A	BRKT,SPACER	EA	1.000	ARC-B\1010030	33
5330	14021		SPACER,HEX,THD,F,B W/NI,1/4 HEX X 5/8 LG X 6-32	EA	4.000	KEY\1451D	34
5340	1009350-101	A	GLIDE	EA	2.000	ARC-D\1009350	35
5350	69120		RIVET,GRIP-TITE,A,1/8"DIA,1/8-1/4"MAT'L THK	EA	12.000	GRA\5X520	36
5360	69375	-	SCREWLOCK KIT,METRIC,IEEE-488	EA	1.000	AMP\554808-1	37
5370	69262		SCREWLOCK KIT,F,USE WITH METAL SHELL"D"CONN	EA	2.000	AMP\207952-1	38
5380	12044		WASH,FLAT,NYLON,.312 OD X .140 ID X .125 THK	EA	8.000	MIP\16FW006125	39
5390	14007		SPACER,HEX,NON-THD,.250 HEX X .250 LG X 6 ID	EA	4.000	HHS\2300	40
5400	13003		NUT,HEX,S/S,4-40,.187AF	EA	4.000		41
5410	12037		WASH,SHLDR,N,.232 OD X .115 ID X .047 SHLD.THK.	EA	1.000	REL\NY-04-040	42
5420	69090		INSUL,HD ANODIZED,TYPE TO-220,.950 L,.500 W	EA	1.000	THM\4777A	43
5430	12024		WASH,FLAT,B/ZN PLTG,.312 OD X .164 ID X .125 THK	EA	8.000	\S785-M01-F21-.164	44
5440	12049		WASH,LOCK,SPLIT,S/S,#8	EA	4.000	\MS35338-137	45
5450	13006		NUT,HEX,S/S,8-32,.343AF	EA	4.000	\MS35649-284	46
5460	11064		SCREW,MACH,FLT HD,100 DEG,CROSS-REC,S/S,6-32 X .38	EA	3.000	\MS24693-C26	47
5470	11143		SCREW,MACH,FL HD,100 DEG,CROSS-REC,S/S,8-32 X .25	EA	4.000	\MS24693-C46	48
5480	12059		WASH,LOCK,EXT TOOTH,S/S,#10	EA	3.000	\MS35335-60	49
5490	12050		WASH,LOCK,SPLIT,S/S,#10	EA	3.000	\MS35338-138	50
5500	13007		NUT,HEX,S/S,10-32,.343AF	EA	4.000		51
5510	11020		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X .50	EA	4.000	\MS51957-30	52
5520	11065		SCREW,MACH,FLT HD,100 DEG,CROSS-REC,S/S,6-32 X .50	EA	2.000	\MS24693-C28	53

BILL NO: 1009470-501 REV: H U/M: EA DRAWING NO: ARC-D\1009470
PWR SUPPLY/COMBINER ASSY

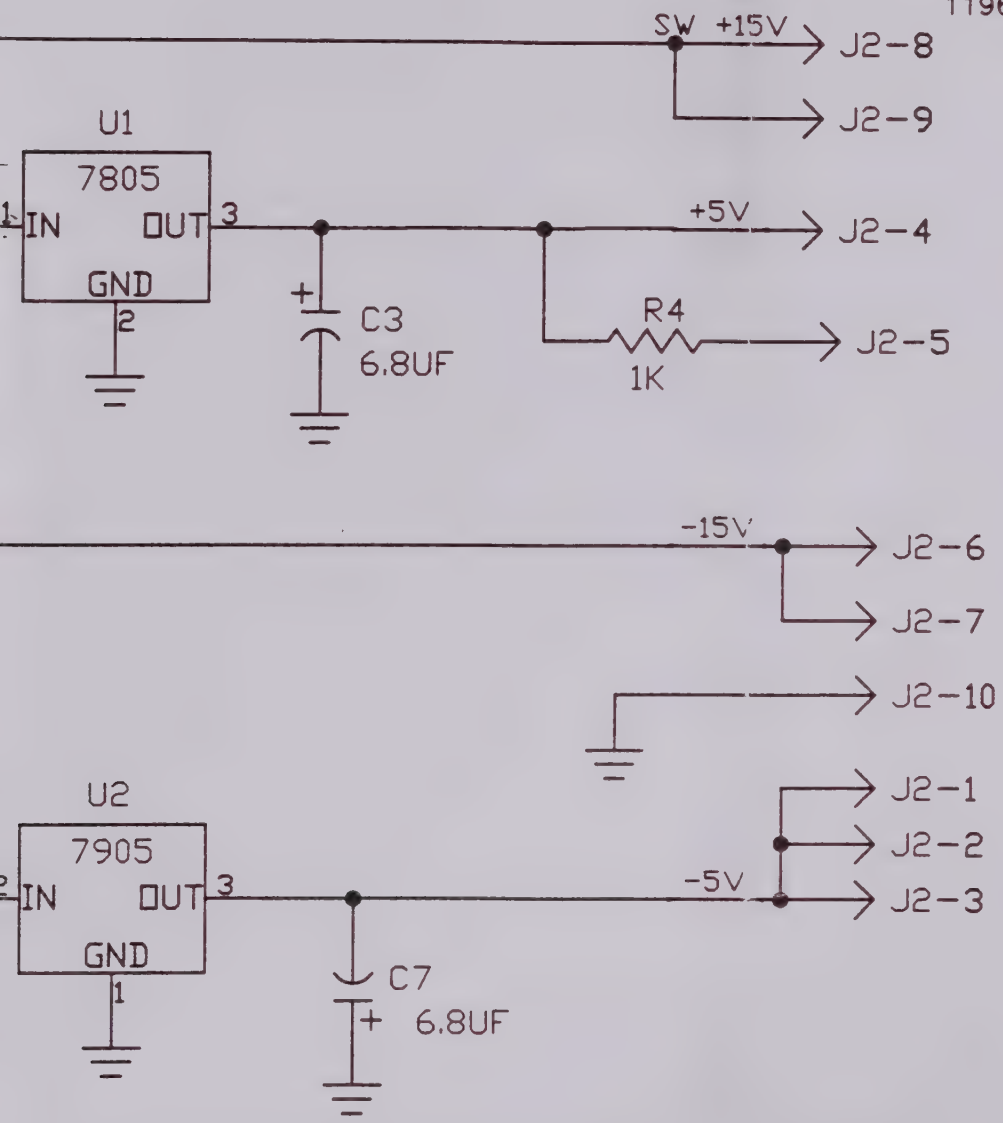
SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
5530	69100		LUG,SHAKEPROOF,BENT,41/64 L,#6 STUD,DUAL HOLE	EA	1.000	HHS\1416-6	54
5540	69171		ALLIGATOR STRIP,BLK,.052 TO .085 CHASSIS THKNESS	FT	A/R	PLM\CSG-09	55
5550	69079		GROMMET,RUBBER,3/4 OD,7/16 ID,9/16MTG.HOLE,1/16THK	EA	1.000	HHS\2177	56
5560	11012		SCREW,MACH,PAN HD,CROSS-REC,S/S,4-40 X .50	EA	2.000	\MS51957-17	57
5570	69111		PLUG,HOLE,METAL,5/8"DIA HOLE,13/16"O/A DIA	EA	2.000	HHS\654	58



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ECN	DATE	REV
XXXX	26JUN98	1
REL	26MAY99	—

REL. NO. 1196-03



ITEM	PART NO.	DESCRIPTION	MARK	FIN	MATL
QTY. REQD.	PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015

ANGULAR DIMENSIONS 1/2°

100S1G4
USED ON MODEL

DRAWN J.H.REED DATE 26 JUNE 98
CHKD J.H.REED DATE 26 MAY 99
MECH DATE
ELEC DATE

AMPLIFIER RESEARCH

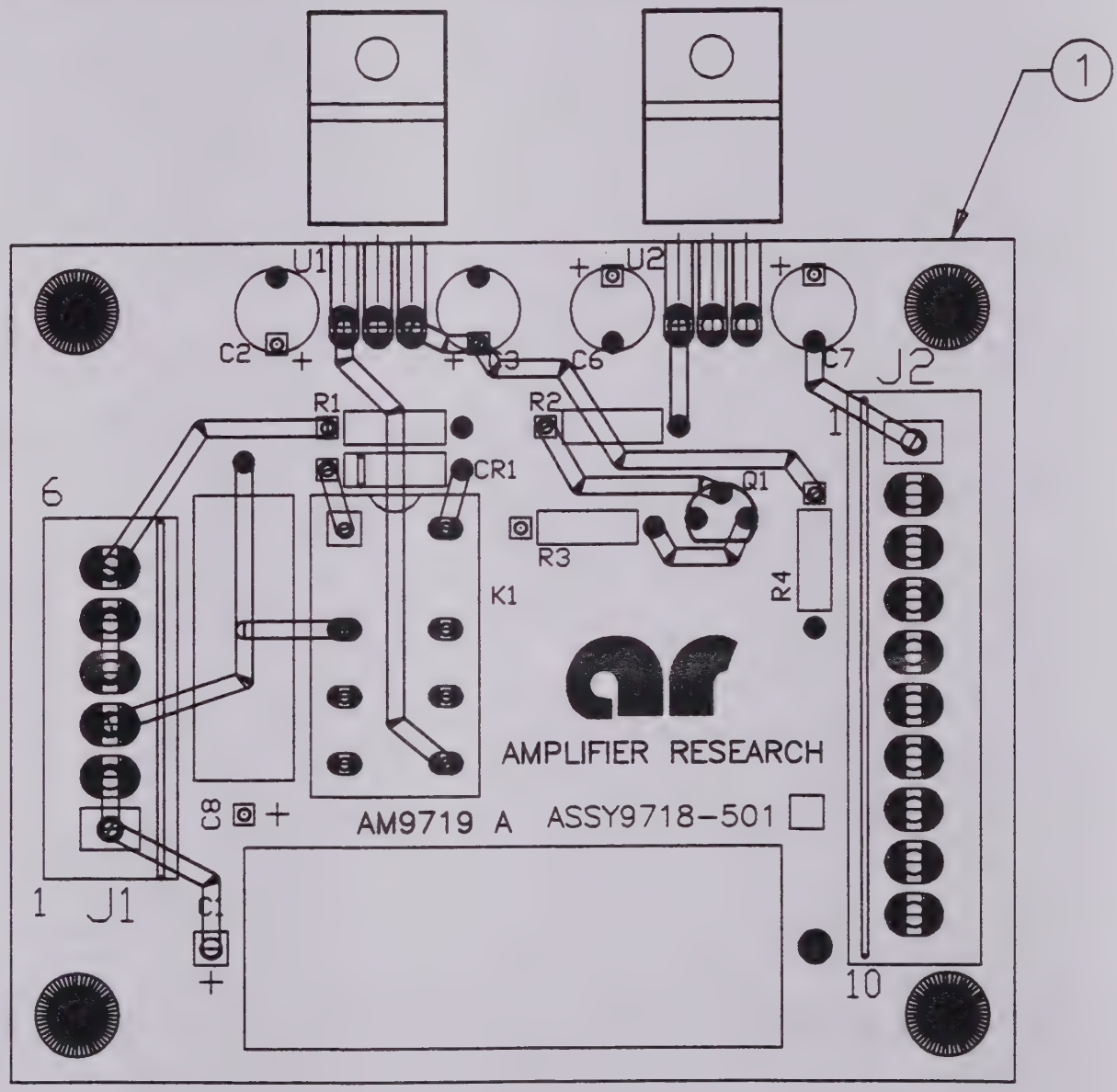
SCHEMATIC
REGULATOR BD.\100S1G4

DWG. NO. 1009720

SCALE NONE | SHEET 1 OF 1 | REV. —

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U1 AND U2 ARE SHOWN FOR REF ONLY



ECN	DATE	REV
XXXX	01JUL98	1
REL	26MAY99	–
10637	07AUG00	A

REL.NO
1196-03

FOR BOM SEE: 1009718-501

QTY. REQD.	ITEM	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015

ANGULAR DIMENSIONS 1/2°

100S1G4
USED ON MODEL

DRAWN J.H.REED
DATE 01 JULY 98

CHKD J.H.REED
DATE 26 MAY 99

MECH J.MACINN
DATE 16 JUNE 99

ELEC F.SCHIRK
DATE 02 JUNE 99

AMPLIFIER RESEARCH

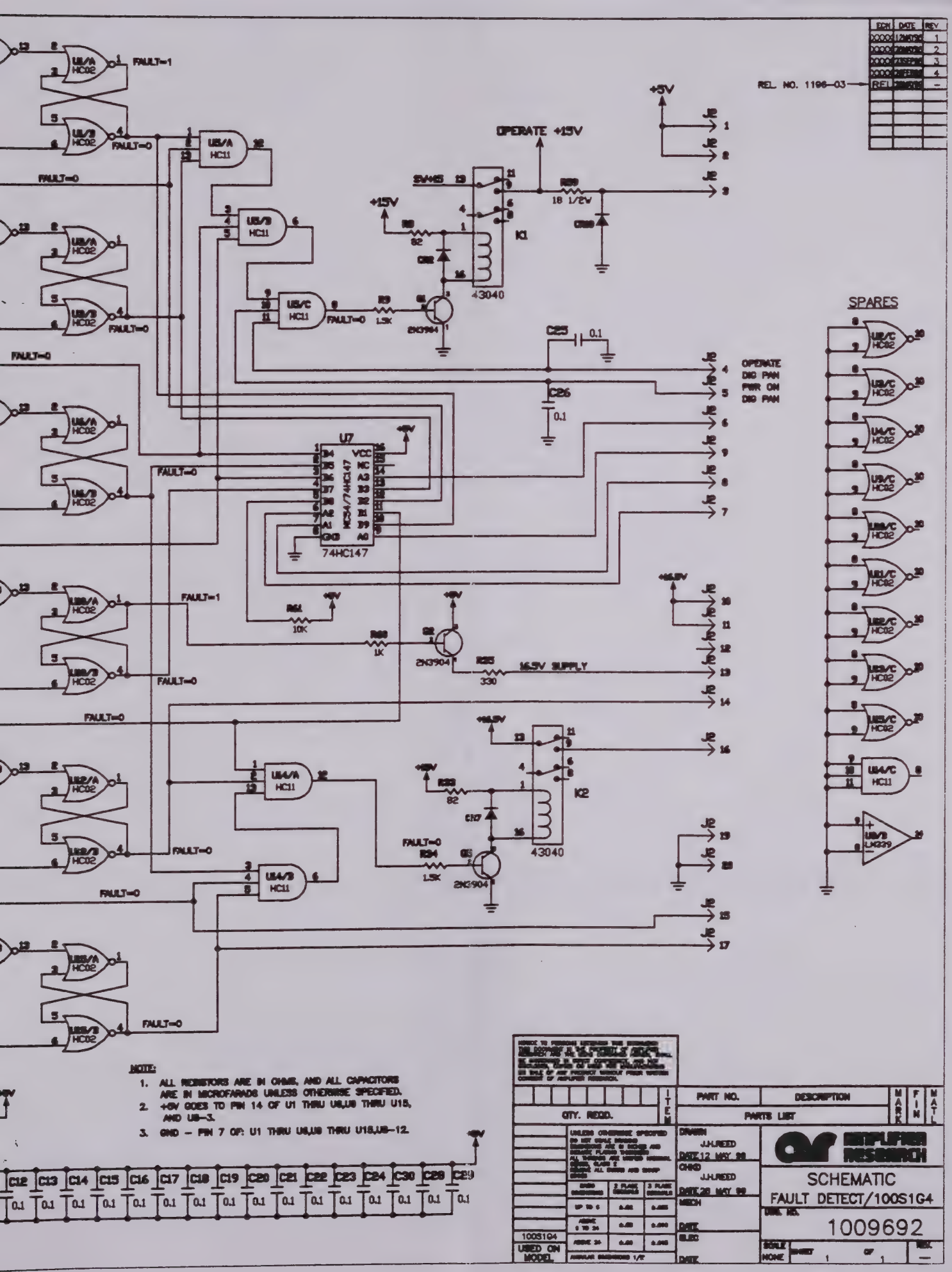
ASSEMBLY
REGULATOR BD./100S1G4

DWG. NO. 1009718

SCALE 2/1 | SHEET 1 OF 1 | REV. A

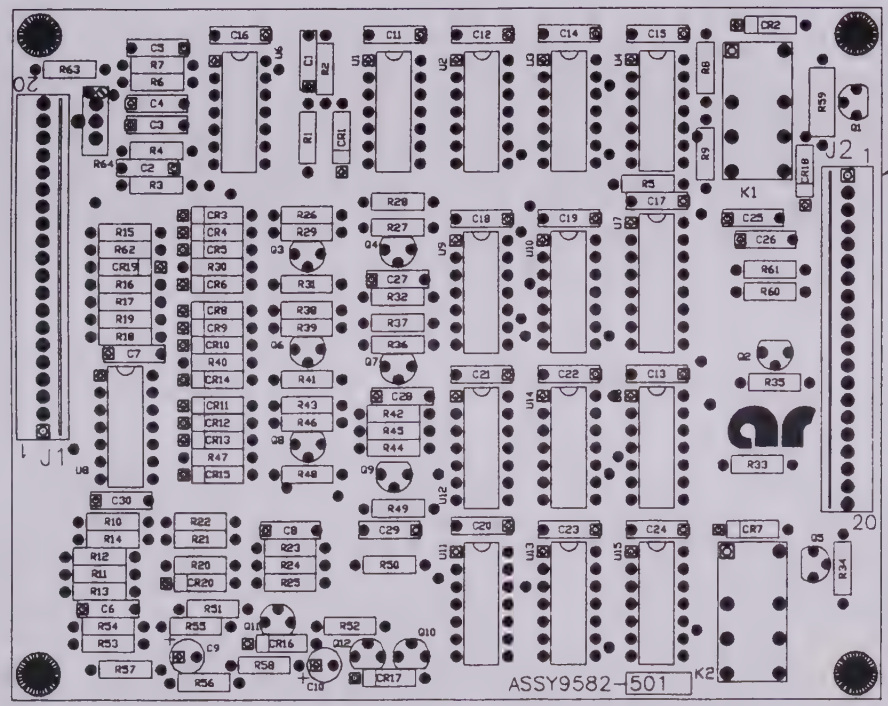
BILL NO: 1009718-501 REV: A U/M: EA DRAWING NO: ARC-A\1009718
PWB ASSY,REGULATOR BD/100S1G4

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1009718	A	ASSY DWG,REGULATOR BD,100S1G4	EA	REF	ARC-B\1009718	
0020	1009720	-	SCHEM DIAG,REGULATOR BD,100S1G4	EA	REF	ARC-B\1009720	
0400	27085		CAPR,ELECT,1500uF,50V,AXIAL	EA	1.000	ICI\158TTA050A	C1
0405	27047		CAPR,TANT,1UF,50V	EA	2.000	MAL\TDC105K050WSE	C2 ,C6
0410	27055		CAPR,TANT,6.8UF,50V	EA	2.000	MAL\TDC685K050NLF	C3 ,C7
0420	27068		CAPR,ELECT,100uF,50VDC,AXIAL	EA	1.000	ICI\107TTA050M	C8
0700	1N4448		DIODE,SIGNAL,75V PIV	EA	1.000	FCH\1N4448	CR1
1500	41083		CONN,LOCKING HEADER,STR,6 PIN	EA	1.000	PNT\MLSS156-6-C	J1
1510	41084		CONN,LOCKING HEADER,STR,10 PIN,SQR POSTS	EA	1.000	PNT\MLSS156-10-L	J2
1700	43040		RELAY,LO-PWR,DPDT,12VDC,360 OHMS,PIN L POS	EA	1.000	ARO/DS2EMDC12V	K1
2500	2N3904		XSTR,SWNG,NPN,40V,0.2A,1W	EA	1.000		Q1
2700	55612-1501J		RES,FXD,METAL FILM,1.5K,5%,1/4-1/2W	EA	3.000	TRW\GP55-1501+/-5%	R1 ,R2 R4
2710	55612-82R0J		RES,FXD,METAL FILM,82,5%,1/4-1/2W	EA	1.000	TRW\GP55-82R0+/-5%	R3
3700	60045		INTEGRATED CKT,3 TERM,POS REG.	EA	REF	MOT\MC7805CT	U1
3710	60066		IC,3 TERM,NEG REG	EA	REF	MOT\MC7905CT	U2
5000	1009719-101	A	PWB,REGULATOR BD,100S1G4	EA	1.000	ARC-B\1009719	1


REL. NO. 1196-03
+5V
OPERATE +15V
+15V
K1
43040
2N3904
SPARES
U7
74HC147
FAULT=0
FAULT=1
OPERATE
DIG PAN
PWR ON
DIG PAN
16.5V SUPPLY
K2
NOTE:
1. ALL RESISTORS ARE IN OHMS, AND ALL CAPACITORS ARE IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
2. +5V GOES TO PIN 14 OF U1 THRU U6,U8 THRU U15, AND U8-3.
3. GND - PIN 7 OF: U1 THRU U6,U8 THRU U15,U8-12.
PART NO.
DESCRIPTION
PARTS LIST
QTY. REQD.
ITEM
MARK
FIN
MATL
DRAWN J.J.REED
CHKD J.J.REED
MECH
ELEC
USED ON MODEL 1005194
SCHEMATIC
FAULT DETECT/100S1G4
DWG. NO. 1009692
SCALE NONE
SHEET 1 OF 1
REV —

ECN	DATE	REV
XXXX	29MAY98	-
XXXX	03DEC98	-
XXXX	26FEB99	-
REL	28MAY99	-

REL NO 1196-03



FOR BOM SEE: 1009582-501

QTY. REQD.	ITEM	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.05	±.015
ANGULAR DIMENSIONS 1/2°		

DRAWN J.H.REED DATE 03 DEC 98
CHKD J.H.REED DATE 28 MAY 99
MECH DATE
ELEC DATE

100S1G4
USED ON MODEL

AMPLIFIER RESEARCH

ASSEMBLY DRAWING
FAULT DETECT/100S1G4

DWG. NO. 1009582

SCALE 2/1 SHEET 1 OF 1 REV. -

BILL NO: 1009582-501 REV: - U/M: EA DRAWING NO: ARC-A\1009582
PWB ASSY,FAULT DETECT BD/100S1G4

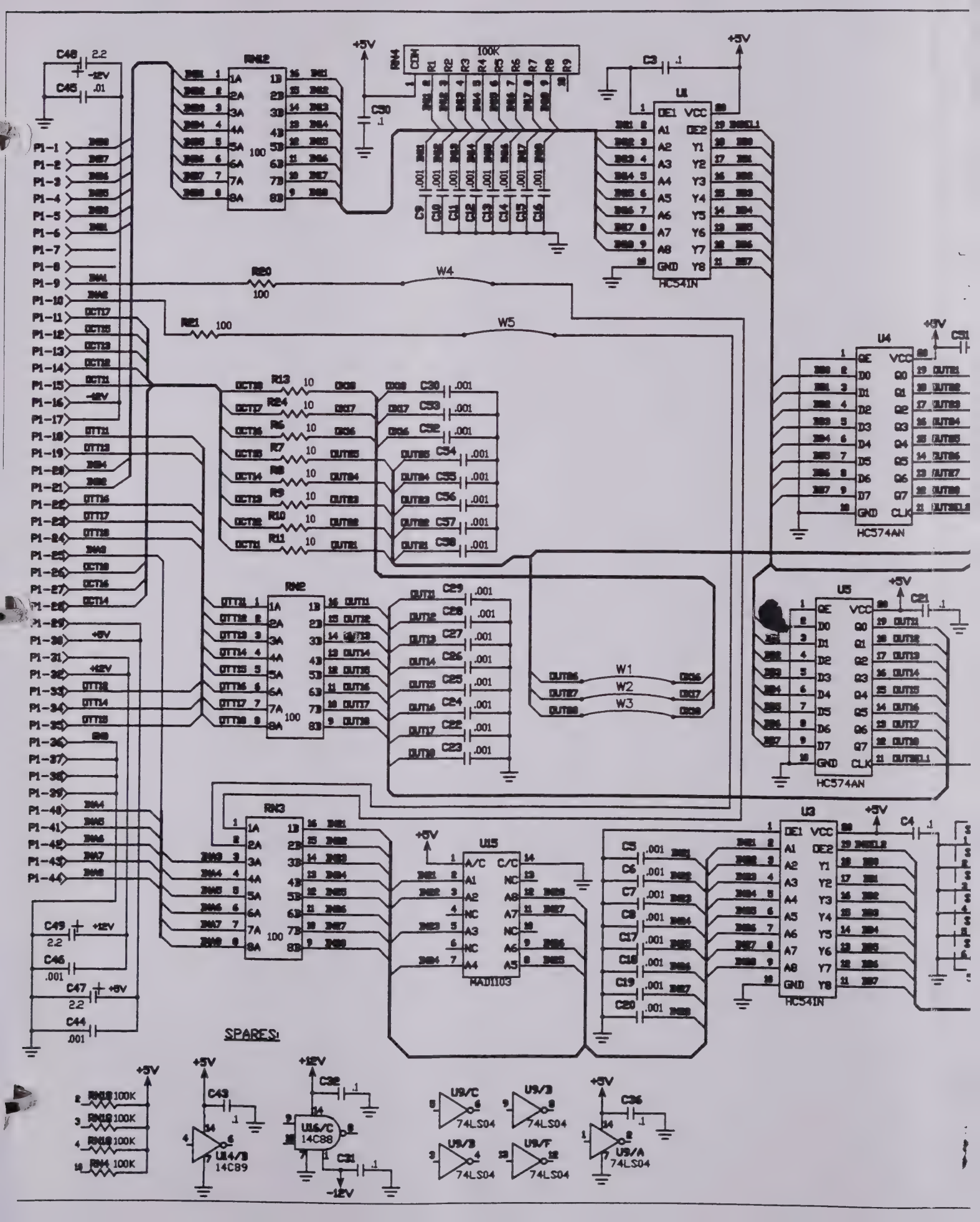
SEQ	PART NUMBER	REV	DESCRIPTION	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1009582	-	ASSY DWG,FAULT DETECT BD/100S1G4	EA	REF	ARC-C\1009582	
0020	1009692	-	SCHEM DIAG,FAULT DETECT BD,100S1G4	EA	REF	ARC-D\1009692	
0400	27236		CAPR,FXD,DIP SPACED CER,.1UF,50VDC	EA	28.000	AVX\MD015C104MAA	C1 ,C2 C3 ,C4 C5 ,C6 C7 ,C8 C11 ,C12 C13 ,C14 C15 ,C16 C17 ,C18 C19 ,C20 C21 ,C22 C23 ,C24 C25 ,C26 C27 ,C28 C29 ,C30
0410	27059		CAPR,ELECT,10uF,50V,+/-20%,RADIAL	EA	2.000	PAN\ECEA1HU100	C9 ,C10
0700	1N5231B		DIODE,ZENER,5.1V,5%,500MW	EA	1.000	MOT\1N5231B	CR1
0710	1N4448		DIODE,SIGNAL,75V PIV	EA	19.000	FCH\1N4448	CR2 ,CR3 CR4 ,CR5 CR6 ,CR7 CR8 ,CR9 CR10 ,CR11 CR12 ,CR13 CR14 ,CR15 CR16 ,CR17 CR18 ,CR19 CR20
1500	41187		CONN,LOCKING HEADER,STR,20 PIN,.10 CNTRS	EA	2.000	PNT\MLSS100-20	J1 ,J2
1700	43040		RELAY,LO-PWR,DPDT,12VDC,360 OHMS,PIN L POS	EA	2.000	ARO/DS2EMDC12V	K1 ,K2
2500	2N3904		XSTR,SWNG,NPN,40V,0.2A,1W	EA	9.000		Q1 ,Q2 Q3 ,Q5 Q6 ,Q8 Q10 ,Q11 Q12
2510	2N3906		XSTR,SWNG,PNP,40V,0.2A,1W	EA	3.000	ARE\2N3906	Q4 ,Q7 Q9
2700	55612-1002J		RES,FXD,METAL FILM,10K,5%,1/4-1/2W	EA	19.000	TRW\GP55-1002+/-5%	R1 ,R2

BILL NO: 1009582-501 REV: - U/M: EA DRAWING NO: ARC-A\1009582
PWB ASSY,FAULT DETECT BD/100S1G4

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
							R3 ,R4 R5 ,R6 R17 ,R18 R22 ,R23 R31 ,R41 R48 ,R50 R54 ,R55 R57 ,R58 R61
2710	55612-4701J		RES,FXD,METAL FILM,4.7K,5%,1/4-1/2W	EA	2.000	TRW\GP55-4701+/-5%	R7 ,R25
2720	55612-82R0J		RES,FXD,METAL FILM,82,5%,1/4-1/2W	EA	3.000	TRW\GP55-82R0+/-5%	R8 ,R24 R33
2730	55612-1501J		RES,FXD,METAL FILM,1.5K,5%,1/4-1/2W	EA	7.000	TRW\GP55-1501+/-5%	R9 ,R11 R28 ,R34 R37 ,R45 R63
2740	55612-2001J		RES,FXD,METAL FILM,2.0K,5%,1/4-1/2W	EA	3.000	TRW\GP55-2001+/-5%	R10 ,R13 R16
2750	55612-1502J		RES,FXD,METAL FILM,15K,5%,1/4-1/2W	EA	3.000	TRW\GP55-1502+/-5%	R14 ,R1 R20
2760	55612-2203J		RES,FXD,METAL FILM,220K,1%,1/4-1/2W	EA	3.000	TRW\GP55-2203+1-5%	R12 ,R21 R62
2780	55612-3901J		RES,FXD,METAL FILM,3.9K,5%,1/4-1/2W	EA	4.000	TRW\GP55-3901+/-5%	R19 ,R26 R38 ,R43
2790	55612-1500J		RES,FXD,METAL FILM,150,5%,1/4-1/2W	EA	3.000	TRW\GP55-1501+/-5%	R27 ,R36 R44
2800	55612-8201J		RES,FXD,METAL FILM,8.2K,5%,1/4-1/2W	EA	3.000	TRW\GP55-8201+/-5%	R29 ,R39 R46
2810	55512-33R0J		RES,FXD,CARBON COMP,33,5%,1/4W	EA	3.000	A-B\CB3305	R30 ,R40 R47
2820	55612-3300J		RES,FXD,METAL FILM,330,5%,1/4-1/2W	EA	4.000	TRW/GP55-330 +/-1%	R32 ,R35 R42 ,R49
2830	55612-3301J		RES,FXD,METAL FILM,3.3K,5%,1/4-1/2W	EA	2.000	TRW\GP55-3301+/-5%	R51 ,R52
2840	55612-4702J		RES,FXD,METAL FILM,47K,5%,1/4-1/2W	EA	2.000	TRW\GP55-4702+/-5%	R53 ,R56

BILL NO: 1009582-501 REV: - U/M: EA DRAWING NO: ARC-A\1009582
PWB ASSY,FAULT DETECT BD/100S1G4

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
2850	55513-18R0J		RES,FXD,CARBON COMP,18,5%,1/2W	EA	1.000		R59
2860	55612-1001J		RES,FXD,METAL FILM,1K,5%,1/4-1/2W	EA	1.000	TRW\GP55-1001+/-5%	R60
2870	55917		RES,VAR,CERMET,MULTITURN,TOP ADJ,1K,10%,1W	EA	1.000	MEP\RJ24FW102	R64
3700	60111		IC,QUAD 2-INPUT NOR GATE	EA	11.000	MOT\MC74HC02N	U1 ,U2 U3 ,U4 U6 ,U9 U10 ,U11 U12 ,U13 U15
3710	60105		IC,TRIPLE 3-INPUT AND GATE	EA	2.000	NSI\MM74HC11	U5 ,U14
3720	60110		IC,DECIMAL-TO-BCD ENCODER	EA	1.000	MOT\MC74HC147N	U7
3730	60023		INTEGRATED CKT,LINEAR,QUAD COMPARATOR,36 VDC	EA	1.000	NSI\LM339A	U8
4500	73013		SOCKET,I.C.,14 PIN	EA	14.000	TII\C93-14-02	XU1 ,XU2 XU3 ,XU4 XU5 ,XU6 XU8 ,XU9 XU10 ,XU11 XU12 ,XU13 XU14 ,XU15
4510	73014		SOCKET,I.C.,16 PIN	EA	1.000	TII\C93-16-02	XU7
5000	1009583-101	A	PWB,FAULT DETECT BD/100S1G4	EA	1.000	ARC-B\1009583	1

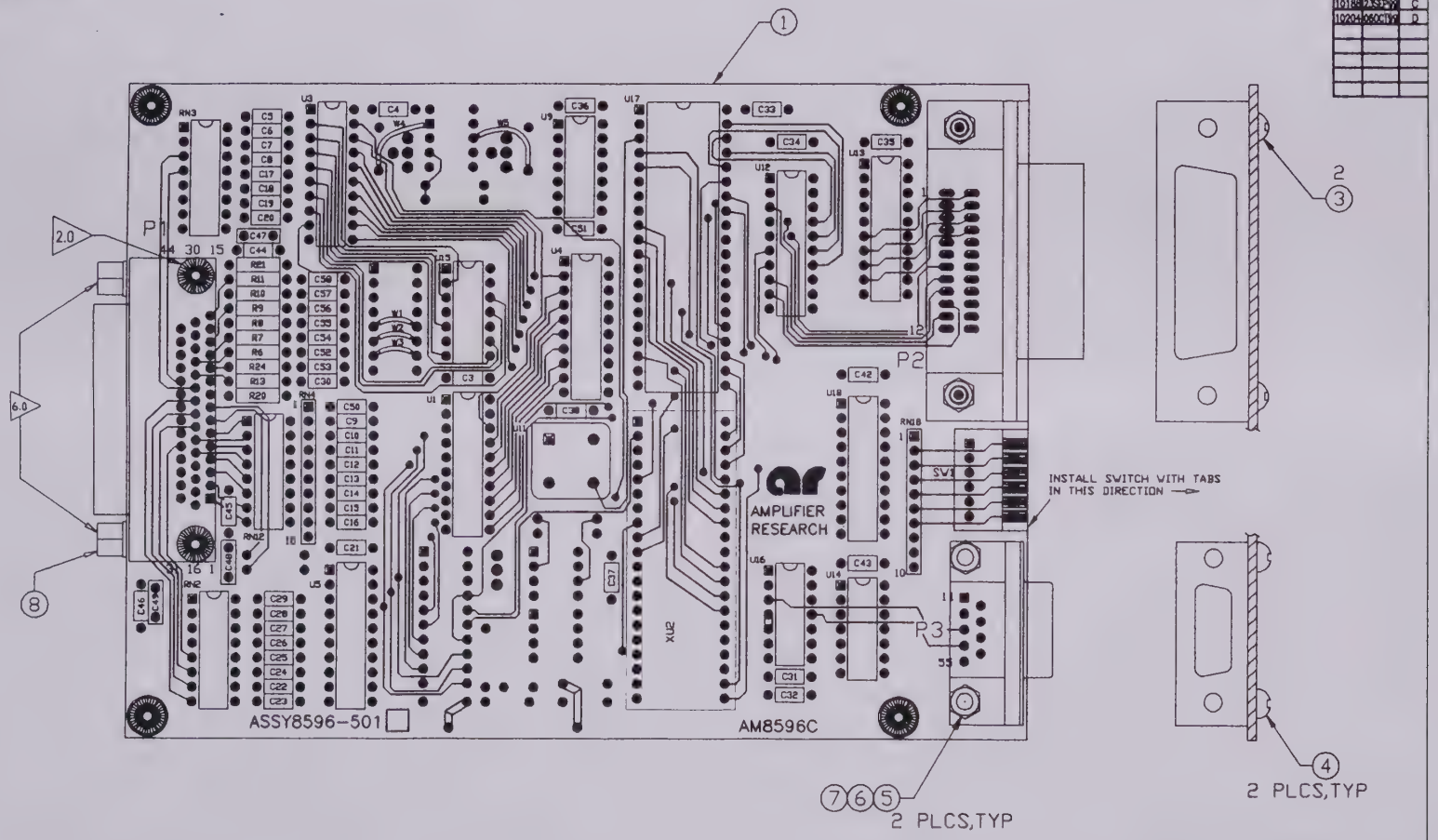

C48 2.2
-12V
C45 .01
RN12
100
+5V
RN4
100K
C30 .1
C3 .1
U1
HC541N
P1-1
P1-2
P1-3
P1-4
P1-5
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RN2
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W3
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C6 .001
C7 .001
C8 .001
C17 .001
C18 .001
C19 .001
C20 .001
U3
HC541N
C4 .1
C49 2.2
+12V
C46 .001
C47 2.2
+8V
C44 .001
SPARES:
RN10 100K
RN11 100K
RN12 100K
RN14 100K
C43 .1
U14/B 14C89
C32 .1
U16/C 14C88
C31 .1
-12V
U9/C 74LS04
U9/D 74LS04
U9/B 74LS04
U9/F 74LS04
C36 .1
U9/A 74LS04

U2
PIC16C65A
U11
CTX169
U14/D
U14/A
U14/C
14C89
U16/A
U16/D
U16/B
14C88
U18
HC541N
U17
NAT7210
U13
U12
75160AN
75161BN
U9/E
74LS04
RN10
100K
C38
C37
C42
C33
C35
C34
+5V
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P3-2
P3-3
P3-4
P3-5
P3-6
P3-7
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SCHEMATIC
REMOTE INTERFACE,500A100A
DWG. NO. 1009893
500A100A
USED ON MODEL
DRAWN J.J.REED
CHKD J.J.REED
MECH J.MASKIN
ELEC J.CATON
SCALE NONE
SHEET 1 OF 1
REV. A

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RELEASE NO. 1185-02

ECN	DATE	REV
REL	21AUG96	-
9778	04FEB97	A
9833	28MAR97	B
10188	23SEP97	C
10204	06OCT97	D



FOR BOM, SEE 1009892-501

NOTES:

1.0 USE SOCKET ONLY ON U2.

2.0 MOUNTING TABS, SOLDER 2 PLACES.

3.0 THIS IS A MULTI-LAYER BOARD, USE CARE IN INSTALLING OR REMOVING COMPONENTS.

4.0 SOLDER FROM FAR SIDE ONLY.

5.0 PLACE JUMPERS W1 - W5 AS SHOWN.

6.0 USE SCREWLOCK AND ONE WASHER EACH. DISCARD OTHER PARTS.

ITEM QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
	PARTS LIST				

UNLESS OTHERWISE SPECIFIED DO NOT SCALE DRAWING. DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS. ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2. REMOVE ALL BURRS AND SHARP EDGES.

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.08	±.030
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015

ANGULAR DIMENSIONS 1/2°

500A100A
USED ON MODEL

DRAWN J.H.REED DATE 14 FEB 97
CHKD J.H.REED DATE 21 AUG 98
MECH J.MAGINN DATE 28 AUG 98
ELEC J.CATON DATE 28 AUG 98

AMPLIFIER RESEARCH

ASSEMBLY DRAWING
REMOTE INTERFACE,500A100A

DWG. NO. 1009892

SCALE 2 : 1 SHEET 1 OF 1 REV. D

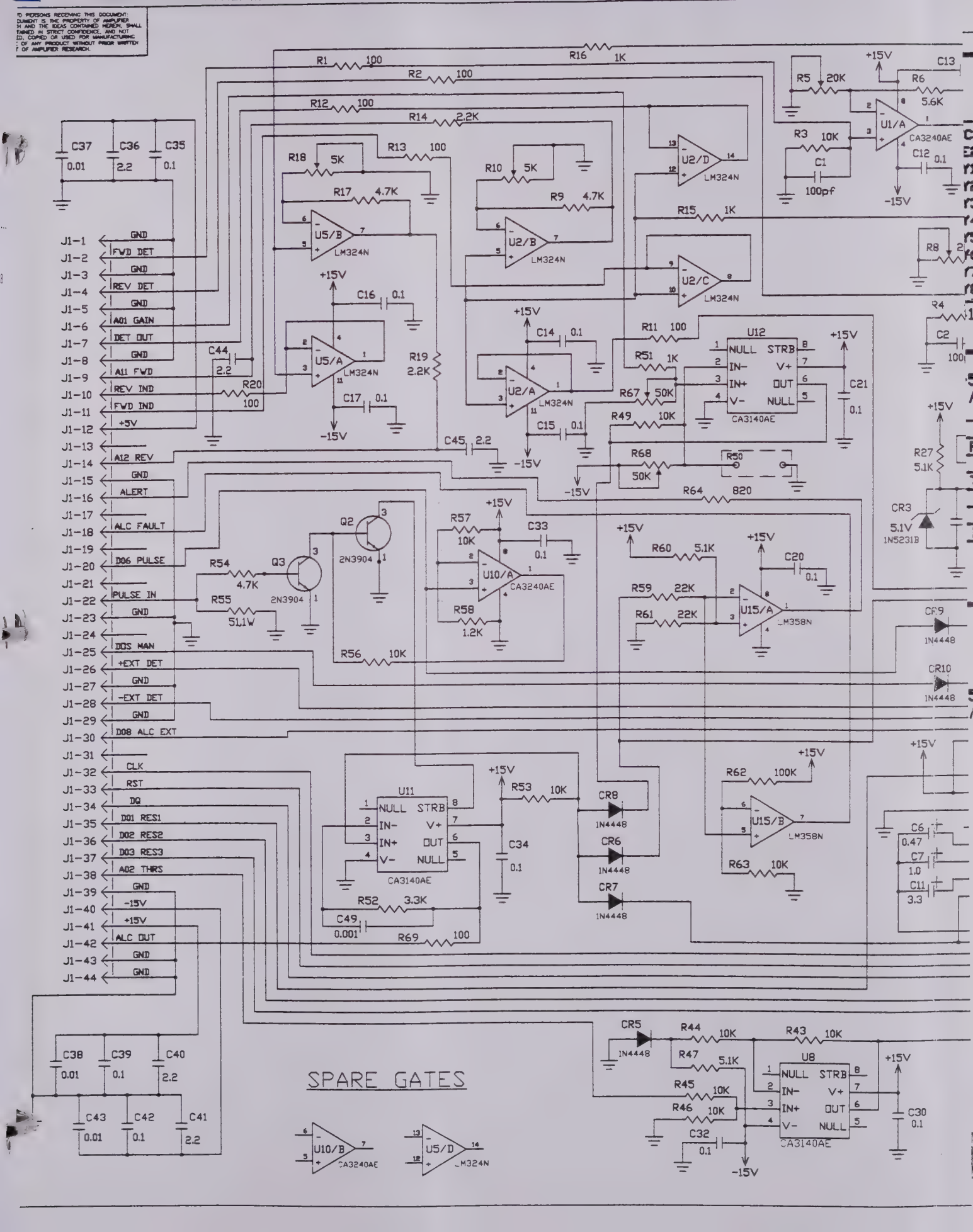
BILL NO: 1009892-501 REV: D U/M: EA DRAWING NO: ARC-C\1009892
PWB ASSY,REMOTE INTERFACE

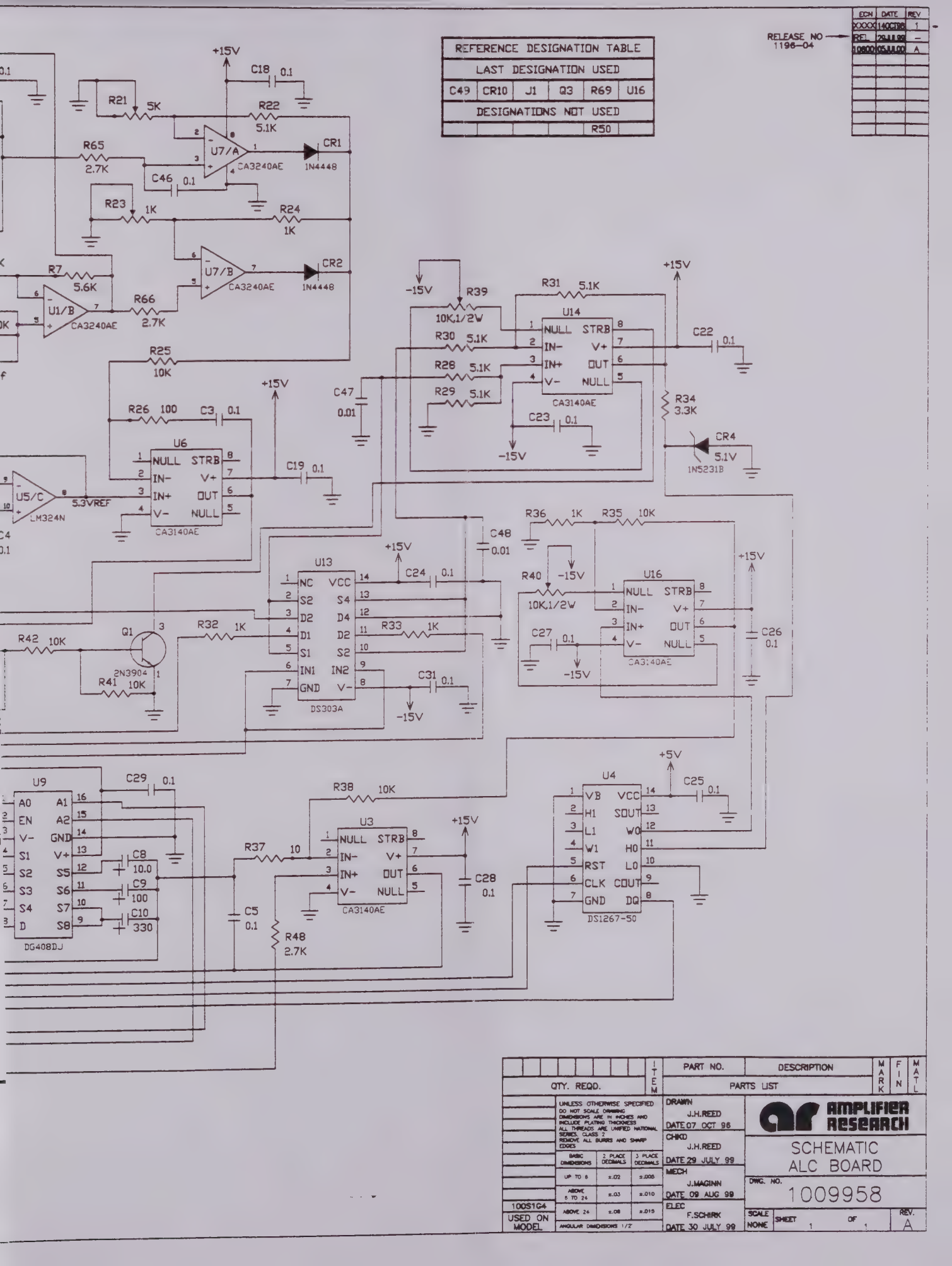
SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1009893	A	SCHEM DIAG,REMOTE INTERFACE	EA	REF	ARC-D\1009893	
0020	1009892	D	ASSY DWG,REMOTE INTERFACE	EA	REF	ARC-C\1009892	
0400	27236		CAPR,FXD,DIP SPACED CER,.1UF,50VDC	EA	15.000	AVX\MD015C104MAA	C3 ,C4 C21 ,C31 C32 ,C33 C34 ,C35 C36 ,C37 C38 ,C42 C43 ,C50 C51
0410	27277		CAPR,FXD,DIP SPACED CER,.001uf	EA	35.000	AVX\MD015C102MAA	C5 ,C6 C7 ,C8 C9 ,C10 C11 ,C12 C13 ,C14 C15 ,C16 C17 ,C18 C19 ,C20 C22 ,C23 C24 ,C25 C26 ,C27 C28 ,C29 C30 ,C44 C45 ,C46 C52 ,C53 C54 ,C55 C56 ,C57 C58
0420	27229		CAPR,CER,2.2uF,50V	EA	3.000	\RPE210Z5U225Z050V	C47 ,C48 C49
1500	41234		CONN,RECEPT,44 CKT,R.A. PC MOUNT	EA	1.000	AMP\748482-5	P1
1510	41241		CONN,RECEPT,24PIN	EA	1.000	AMP\553811-1	P2
1520	41242		CONN,RECEPT,9 PIN	EA	1.000	AMP\745781-4	P3
2700	55612-10R0F		RES,FXD,FILM,10 OHM	EA	10.000	\RN55D10R0F	R6 ,R7 R8 ,R9 R10 ,R11 R13 ,R20 R21 ,R24
2750	55945		RES,16 PIN DIP,100 OHM 1/4W	EA	3.000		RN2 ,RN3

BILL NO: 1009892-501 REV: D U/M: EA DRAWING NO: ARC-C\1009892
PWB ASSY,REMOTE INTERFACE

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
							RN12
2760	55943		RES,10 PIN SIP,100K,100MW	EA	2.000	CTS\770-101-R-100K	RN4 ,RN18
3100	57088		SWITCH,DIP ROCKER,6 POS	EA	1.000	GRY/76PSB06	SW1
3700	60087		I.C.,INVERTING BUFFER	EA	3.000	NSI\MM74HC541N	U1 ,U3 U18
3720	60088		I.C.FLIP-FLOP	EA	2.000	NSI\MM74HCD574N	U4 ,U5
3750	60091		I.C.HEX INVERTER	EA	1.000	NSI\DM74LS04N	U9
3770	25085	-	OSC,CLOCK,5.0MHz	EA	1.000	CTS\CTX157-ND	U11
3780	60123		IC,TRANSCEIVER,8 CHANNEL	EA	1.000	TII\SN75161BN	U12
3790	60097		I.C.TRANSCEIVER	EA	1.000	NSI\DS75160AN	U13
3800	60094		I.C.RECEIVER,CMOS	EA	1.000	MAX\MAX1489ECPD	U14
3810	60089		I.C.DIODE ARRAY	EA	1.000	MOT\MAD1103P	U15
3820	60095		I.C.CMOS LINE DRIVER	EA	1.000	MAX\MAX1488ECPD	U16
3830	60086		I.C.NEC MPD7210 REPLACEMENT	EA	1.000	NSI\NAT7210APD	U17
4200	66035		WIRE,TFE,22 AWG,SOLID WHT	IN	A/R	WEI\2822	W1 ,W2 W3 ,W4 W5
4510	73031		SOCKET,IC,40PIN	EA	1.000	TII\C93-40-02	XU2
5000	1008596-101	C	PWB,OPERATE/CONTROL(OCB)	EA	1.000	ARC-C\1008596	1
7100	11032		SCREW,MACH,PAN HD,CROSS-REC,S/ZN,4-40X.38,TYPE SW	EA	A/R		3
7110	11011		SCREW,MACH,PAN HD,CROSS-REC,S/S,4-40 X .38	EA	A/R	\MS51957-15	4
7500	12010		WASH,FLAT,S/S,#4,.250 OD X .125 ID X .022 THK	EA	A/R	\MS15795-803	5
7510	12047		WASH,LOCK,SPLIT,S/S,#4	EA	A/R	\MS35338-135	6
7520	13003		NUT,HEX,S/S,4-40,.187AF	EA	A/R		7
7530	69262		SCREWLOCK KIT,F,USE WITH METAL SHELL"D"CONN	EA	1.000	AMP\207952-1	8

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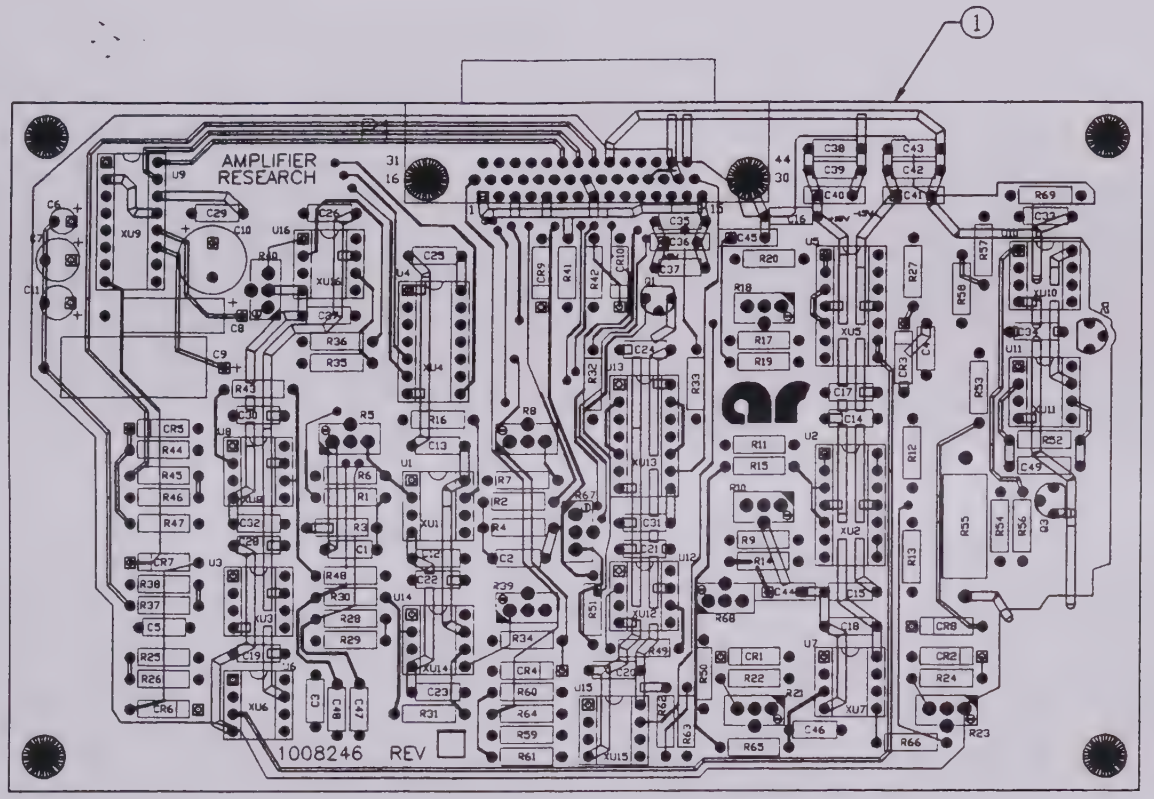



REFERENCE DESIGNATION TABLE
LAST DESIGNATION USED
C49 CR10 J1 Q3 R69 U16
DESIGNATIONS NOT USED
R50
ECN DATE REV
RELEASE NO 1196-04
+15V
-15V
+5V
C18 0.1
R21 5K
R22 5.1K
U7/A
CA3240AE
CR1
1N4448
R65 2.7K
C46 0.1
R23 1K
R24 1K
U7/B
CA3240AE
CR2
1N4448
R7 5.6K
U1/B
CA3240AE
R66 2.7K
R25 10K
R26 100
C3 0.1
U6
NULL STRB
IN- V+
IN+ OUT
V- NULL
CA3140AE
C19 0.1
U5/C
LM324N
5.3VREF
C47 0.01
R39 10K,1/2W
R31 5.1K
U14
R30 5.1K
R28 5.1K
R29 5.1K
C23 0.1
C22 0.1
R34 3.3K
CR4 5.1V
1N5231B
C48 0.01
U13
NC VCC
S2 S4
D2 D4
D1 D2
S1 S2
IN1 IN2
GND V-
DS303A
C24 0.1
C31 0.1
R36 1K
R35 10K
R40 10K,1/2W
U16
C27 0.1
C26 0.1
R42 10K
Q1
2N3904
R41 10K
R32 1K
R33 1K
U9
A0 A1
EN A2
V- GND
S1 V+
S2 S5
S3 S6
S4 S7
D S8
DG408DJ
C29 0.1
C8 10.0
C9 100
C10 330
R37 10
C5 0.1
R48 2.7K
R38 10K
U3
C28 0.1
U4
VB VCC
H1 SOUT
L1 WO
W1 HO
RST LO
CLK COUT
GND DQ
DS1267-50
C25 0.1
ITEM
QTY. REQD.
PART NO.
DESCRIPTION
PARTS LIST
MARK
FIN
MATL
UNLESS OTHERWISE SPECIFIED DO NOT SCALE DRAWING DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2 REMOVE ALL BURRS AND SHARP EDGES
BASIC DIMENSIONS
2 PLACE DECIMALS
3 PLACE DECIMALS
UP TO 6 ±.02 ±.005
ABOVE 6 TO 24 ±.03 ±.010
ABOVE 24 ±.08 ±.015
ANGULAR DIMENSIONS 1/2°
DRAWN J.H.REED DATE 07 OCT 96
CHKD J.H.REED DATE 29 JULY 99
MECH J.MAGINN DATE 09 AUG 99
ELEC F.SCHIRK DATE 30 JULY 99
AMPLIFIER RESEARCH
SCHEMATIC ALC BOARD
DWG. NO. 1009958
SCALE NONE
SHEET 1 OF 1
REV. A
100S1G4
USED ON MODEL

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DWN	DATE	REL
XXXX	14OCT98	
REL	29JUL99	-

RELEASE NO
1196-04



FOR BOM SEE: 1009957-501

QTY. REQD.	ITEM	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.05	±.015
ANGULAR DIMENSIONS 1/2°		

DRAWN J.H.REED DATE 30 JUNE 97
CHKD J.H.REED DATE 29 JULY 99
MECH DATE
ELEC DATE

3500A
100S1G4
USED ON MODEL

AMPLIFIER RESEARCH

ASSEMBLY DRAWING
A.L.C. BOARD

DWG. NO. 1009957

SCALE 2/1 SHEET 1 OF 1 REV. —

BILL NO: 1009957-501 REV: B U/M: EA DRAWING NO: ARC-C\1009957
ALC BD ASSY

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1009957	B	ASSY DWG,ALC BD	EA	REF	ARC-C\1009957	
0020	1009958	B	SCHEM DIAG,ALC BD	EA	REF	ARC-D\1009958	
0100	1011697-101	-	PWB,ALC BD	EA	1.000	ARC-D\1011697	
0400	27237		CAPR,FXD,DIP SPACED CER,100PF,50V	EA	2.000	AVX\MD015A101KAA	C1 ,C2
0410	27236		CAPR,FXD,DIP SPACED CER,.1UF,50VDC	EA	30.000	AVX\MD015C104MAA	C3 ,C4 C5 ,C12 C13 ,C14 C15 ,C16 C17 ,C18 C19 ,C20 C21 ,C22 C23 ,C24 C25 ,C26 C27 ,C28 C29 ,C30 C31 ,C32 C33 ,C34 C35 ,C39 C42 ,C46
0420	27267	-	CAPR,TANT,0.47UF,50V,20%	EA	1.000	PAN\ECS-F1HE474	C6
0430	27047		CAPR,TANT,1UF,50V	EA	1.000	MAL\TDC105K050WSE	C7
0440	27063		CAPR,ELECT,10uF,50V,+/-20%,AXIAL	EA	1.000	PAN\ECEB1HU100	C8
0450	27068		CAPR,ELECT,100uF,50VDC,AXIAL	EA	1.000	ICI\107TTA050M	C9
0460	27246		CAPR,ELECT,330UF,16V,RADIAL	EA	1.000	ICI\337RMR016M	C10
0470	27054		CAPR,TANT,3.3UF,20%,35V	EA	1.000	MAL\TDC335M035NSF	C11
0480	27051		CAPR,TANT,33UF,35VDC,EPOXY	EA	3.000	AVX\TAP336K035HSB	C36 ,C40 C41
0490	27263		CAPR,FXD,DIP SPACED CER,.01uF,100V	EA	7.000	AVX\MD011C103KAB	C37 ,C38 C43 ,C47 C48 ,C50 C51
0500	27229		CAPR,CER,2.2uF,50V	EA	2.000	\RPE210Z5U225Z050V	C44 ,C45
0510	27271		CAPR,CER,1000pf,+/- 5%,100V	EA	1.000	AVX\MD011C102KAA	C49

BILL NO: 1009957-501 REV: B U/M: EA DRAWING NO: ARC-C\1009957
ALC BD ASSY

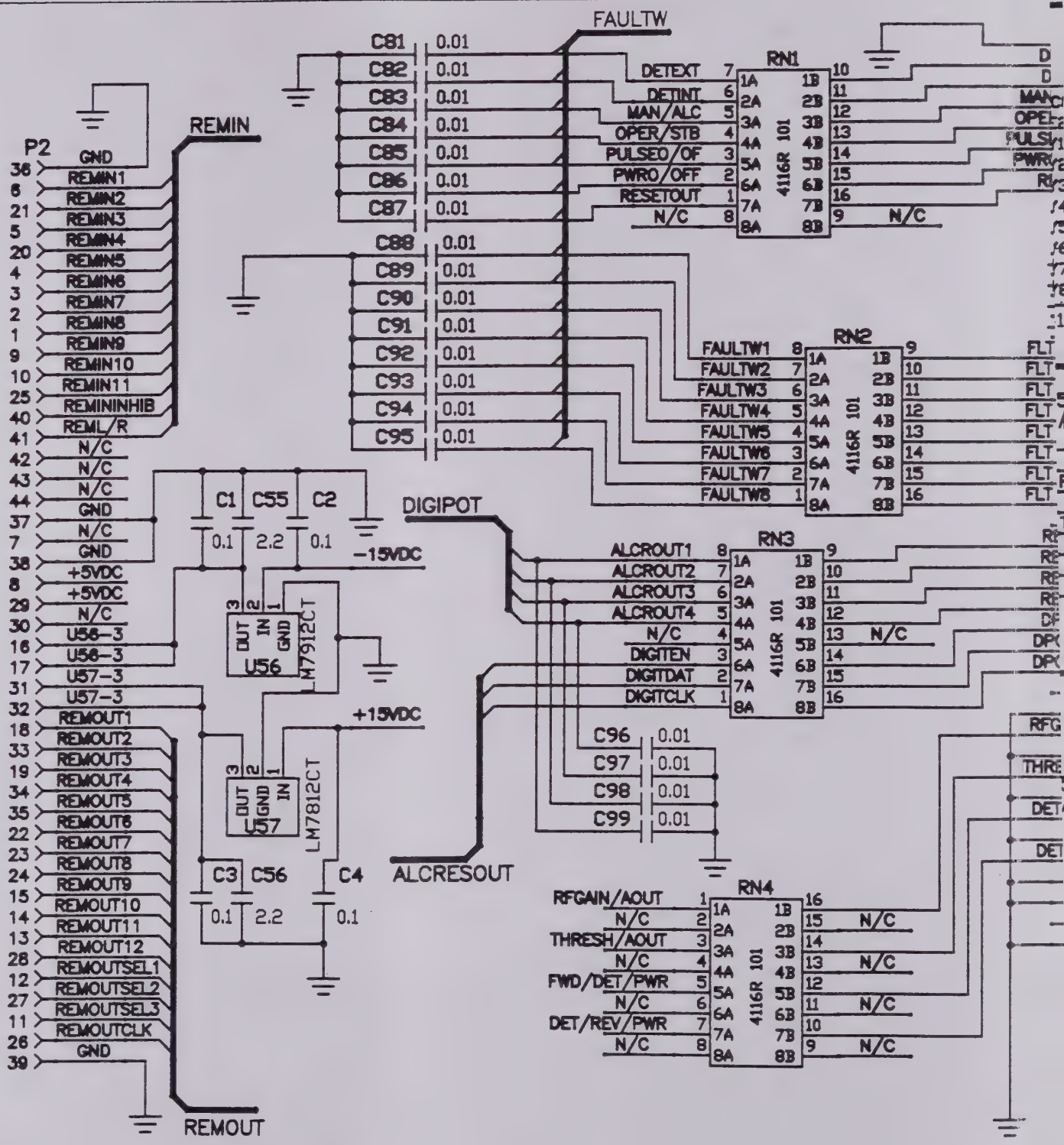
SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0520	27276		CAPR,FXD,DIP SPACED CER,150pf,50VDC	EA	3.000	AVX\MD015C151MAA	C52 .C53 C54
0700	1N4448		DIODE,SIGNAL,75V PIV	EA	8.000	FCH\1N4448	CR1 .CR2 CR5 .CR6 CR7 .CR8 CR9 .CR10
0710	1N5231B		DIODE,ZENER,5.1V,5%,500MW	EA	2.000	MOT\1N5231B	CR3 .CR4
2200	41234		CONN,RECEPT,44 CKT,R.A. PC MOUNT	EA	1.000	AMP\748482-5	P1
2500	2N3904		XSTR,SWNG,NPN,40V,0.2A,1W	EA	3.000		Q1 .Q2 Q3
2700	55612-1000F		RES,FXD 100 OHM1/4W,1%	EA	8.000	MFG\RN55D1000F	R1 .R2 R11 .R12 R13 .R20 R26 .R69
2710	55612-1002F		RES,FXD,PRECISION,10K,1%,1/4-1/2W,CHAR.D	EA	16.000	MFG\RN55D1002F	R3 .R4 R25 .R35 R38 .R4 R42 .R4 R44 .R45 R46 .R49 R53 .R56 R57 .R63
2715	55920		RES,VAR,CERMET,MULTITURN,TOP ADJ,20K,10%,1/2W	EA	2.000	BOR\3299Y-1-203	R5 .R8
2716	55612-5601J		RES,FXD,METAL FILM,5.6K,5%,1/4-1/2W	EA	2.000	TRW\GP55-5601+/-5%	R6 .R7
2718	55612-4701J		RES,FXD,METAL FILM,4.7K,5%,1/4-1/2W	EA	3.000	TRW\GP55-4701+/-5%	R9 .R17 R54
2720	55918		RES,VAR,CERMET,MULTITURN,TOP ADJ,5K,10%,1W	EA	3.000	MEP\8024EKW502	R10 .R18 R21
2730	55612-2201J		RES,FXD,METAL FILM,2.2K,5%,1/4-1/2W	EA	2.000	TRW\GP55-2201+/-5%	R14 .R19
2740	55612-1001F		RES,FXD,PRECISION,1K,1%,1/4-1/2W,CHAR.D	EA	7.000	MFG\RN55D1001F	R15 .R16 R24 .R32 R33 .R36 R51
2750	55612-5101J		RES,FXD,METAL FILM,5.1K,5%,1/4-/12W	EA	8.000	TRW/GP55-5101+/-5%	R22 .R27 R28 .R29

BILL NO: 1009957-501 REV: B U/M: EA DRAWING NO: ARC-C\1009957
ALC BD ASSY

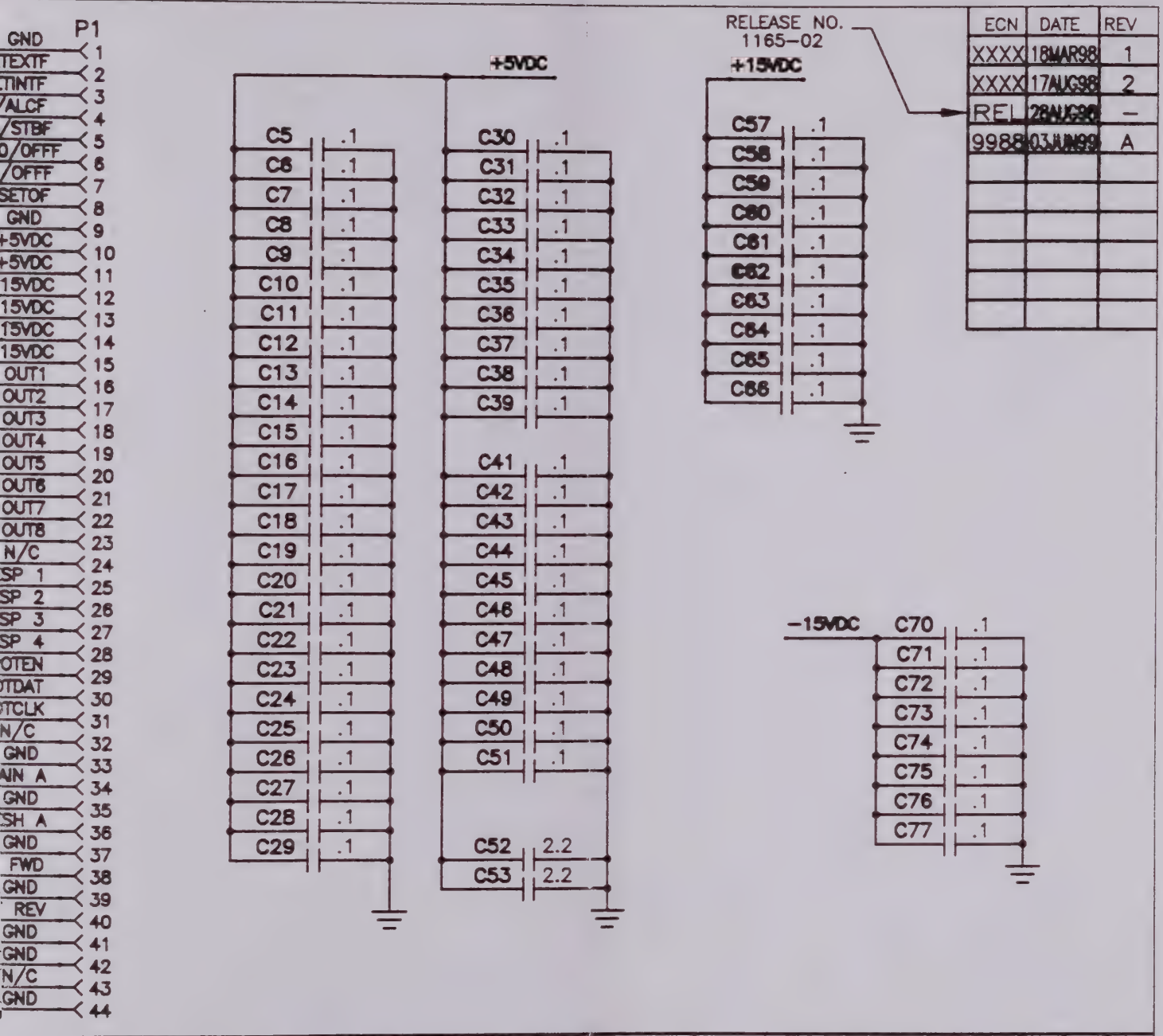
SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
							R30 ,R31
							R47 ,R60
2760	55917		RES,VAR,CERMET,MULTITURN,TOP ADJ,1K,10%,1W	EA	1.000	MEP\RJ24FW102	R23
2770	55612-3301J		RES,FXD,METAL FILM,3.3K,5%,1/4-1/2W	EA	2.000	TRW\GP55-3301+/-5%	R34 ,R52
2775	55512-10R0J		RES,FXD,CARBON COMP,10,5%,1/4W	EA	1.000	A-B\CB1005	R37
2780	55919		RES,VAR,CERMET,MULTITURN,TOP ADJ,10K,10%,1/2W	EA	2.000	BOR\3299Y-1-103	R39 ,R40
2790	55612-2701J		RES,FXD,METAL FILM,2.7K,5%,1/4-1/2W	EA	3.000	TRW\GP55-2701+/-5%	R48 ,R65
							R66
2820	55514-51R0J		RES,FXD,CARBON COMP,51,5%,1W	EA	1.000	A-B\GB5105	R55
2830	55612-1201J		RES,FXD,METAL FILM,1.2K,5%,1/4-1/2W	EA	1.000	TRW\GP55 1.2K 5%	R58
2835	55612-2202J		RES,FXD,METAL FILM,22K,5%,1/4-1/2W	EA	2.000	TRW\GP55-2202+/-5%	R59 ,R61
2840	55612-1003F		RES,FXD 100K,1/4W,1%	EA	1.000	MFG\RN55D1003F	R62
2850	55612-8200J		RES,FXD,METAL FILM,820,5%,1/4-1/2W	EA	1.000	TRW\GP55-8200+/-5%	R64
2855	55922		RES,VAR,CERMET,MULTITURN,TOP ADJ,50K,10%,1/2W	EA	2.000	BOR\3299Y-1-503	R67 ,R68
3700	60013		INTEGRATED CKT,LINEAR,DUAL,OP.AMP.	EA	3.000	RCA\CA3240AE	U1 ,U7
							U10
3710	60057		IC,QUAD OP AMP	EA	2.000	MOT\LM324N	U2 ,U5
3720	60009		INTEGRATED CKT,LINEAR,OP.AMP.	EA	7.000	RCA\CA3140AE	U3 ,U6
							U8 ,U11
							U12 ,U14
							U16
3730	60077		I.C.,DUAL DIG. POT	EA	1.000	DLS\DS1267-50	U4
3740	60079		I.C.,4 CH MUX	EA	1.000	HAR\DG408DJ	U9
3750	60078		I.C.,CMOS ANALOG SW	EA	1.000	HAR\DG303ACJ	U13
3760	60112		INTEGRATED CKT,DUAL DIFF INPUT OP AMP	EA	1.000	NSI\LM358N	U15
4500	73010		SOCKET,I.C.,8 PIN,DIP	EA	11.000	TII\C93-08-02	XU1 ,XU3
							XU6 ,XU7
							XU8 ,XU10
							XU11 ,XU12

BILL NO: 1009957-501 REV: B U/M: EA DRAWING NO: ARC-C\1009957
ALC BD ASSY

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER DRAWING NUMBER	REF-DSGN
						XU14 ,XU15 XU16
4510	73013		SOCKET,I.C.,14 PIN	EA	4.000 TII\C93-14-02	XU2 ,XU4 XU5 ,XU13
4520	73014		SOCKET,I.C.,16 PIN	EA	1.000 TII\C93-16-02	XU9



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ECN	DATE	REV
XXXX	18MAR98	1
XXXX	17AUG98	2
REL	28AUG98	–
9988	03JUN99	A

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
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ABOVE 6 TO 24	±.03	±.010
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ANGULAR DIMENSIONS 1/2°

500A100A
USED ON MODEL

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CHKD J.H.REED DATE 28 AUG 98
MECH J.MAGINN DATE 28 AUG 98
ELEC J.CATON DATE 28 AUG 98

AMPLIFIER RESEARCH

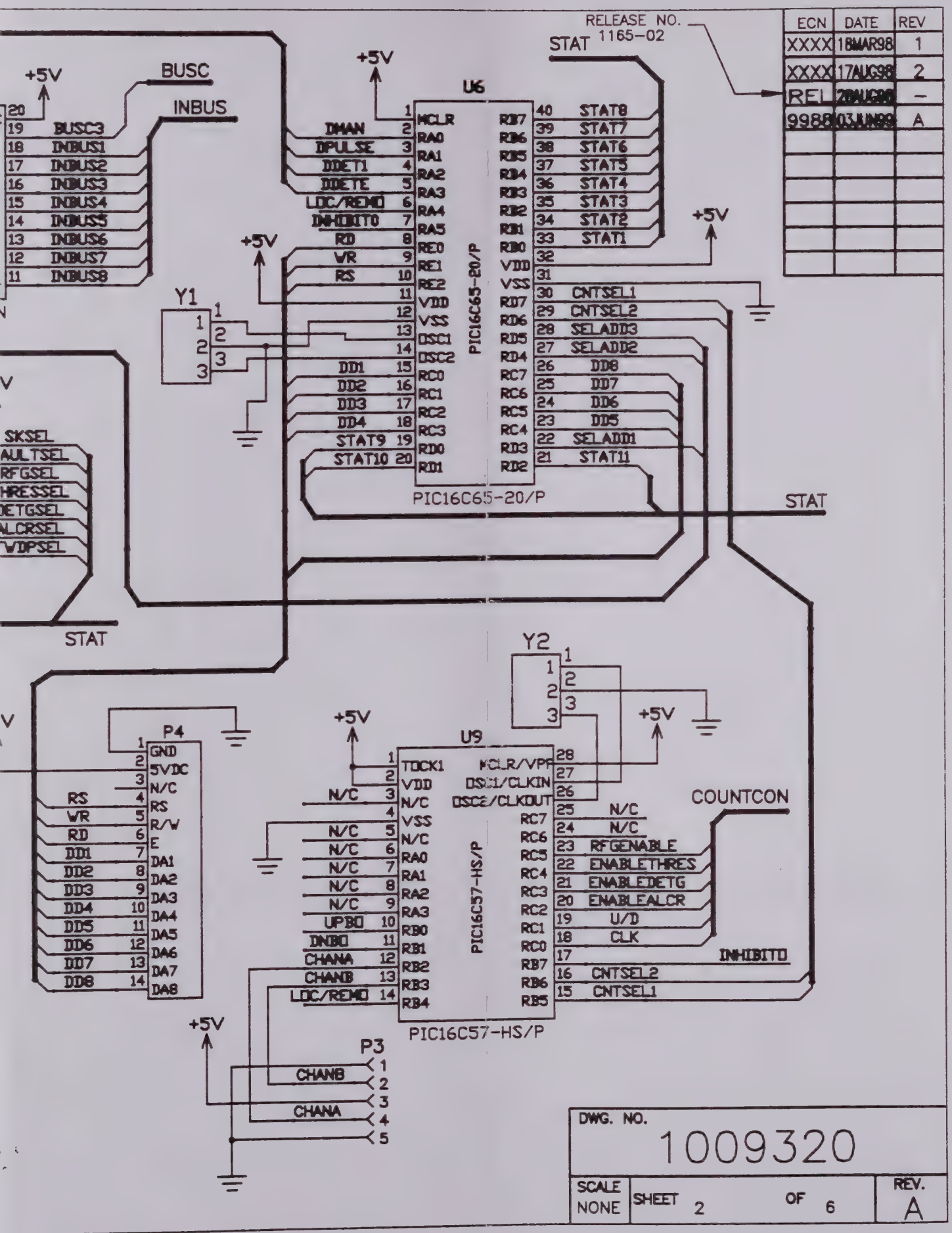
SCHEMATIC
CONTROLLER/4 LINE DISPLAY

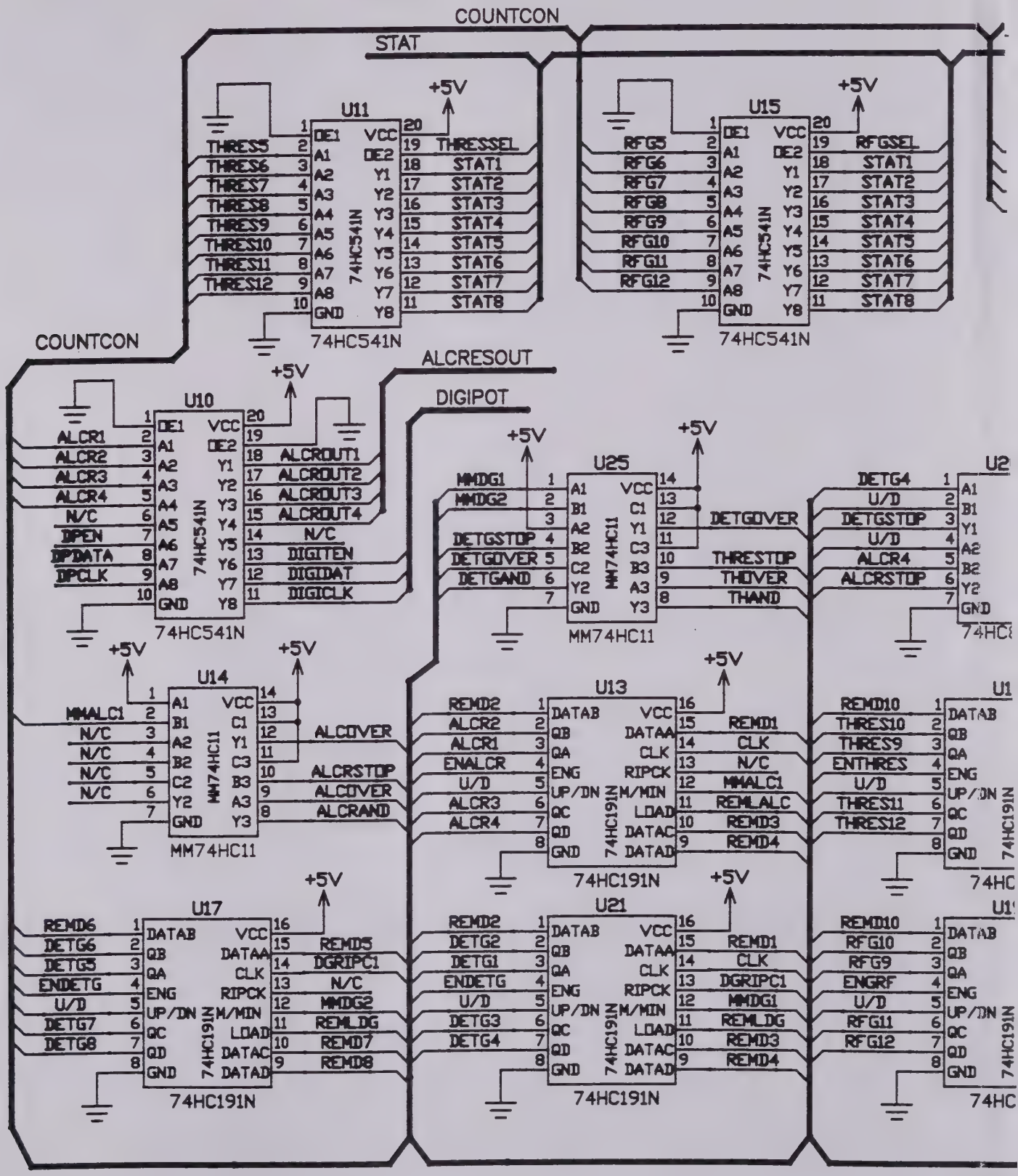
DWG. NO. 1009320

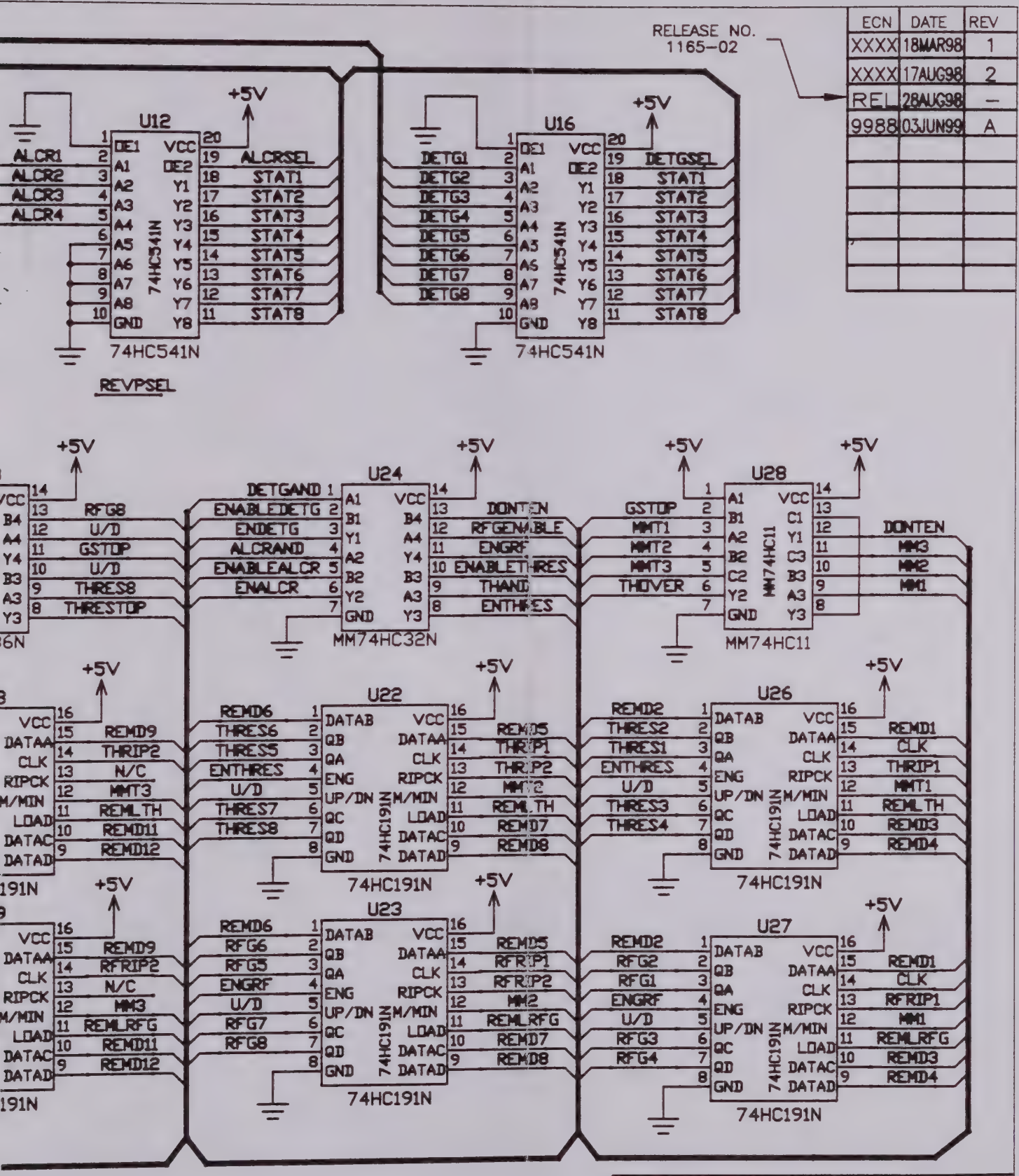
SCALE NONE | SHEET 1 OF 6 | REV. A

CNT:
FIER
, SHALL
NOT
URING
RITTEN

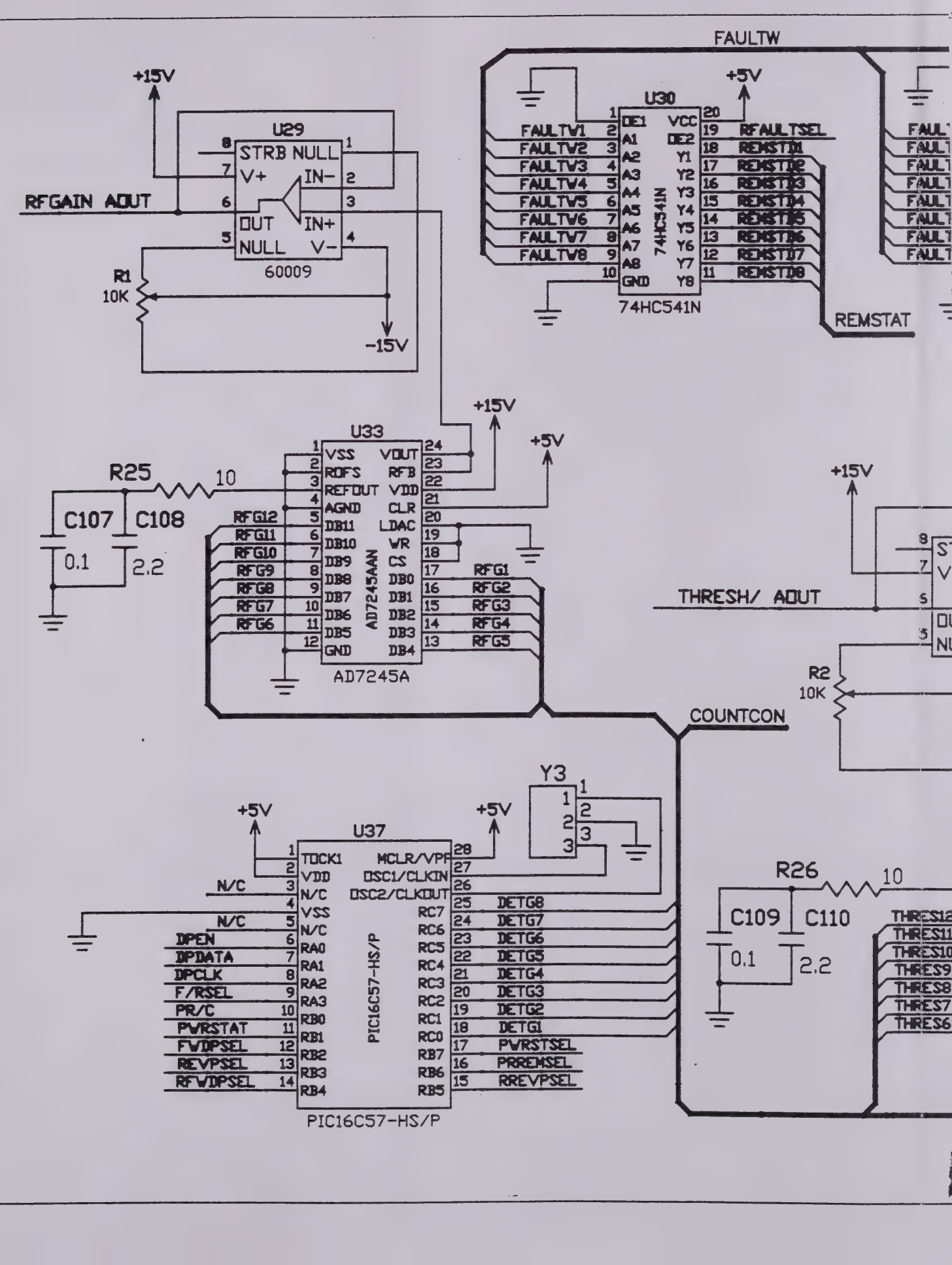
BUSC
OUTBUS
+5V
U1
U2
U3
U4
U5
U7
U8
74HC541N
74HC574AN
74HC138AN
MC14490P
INBUS
BUSC
J5
INHIBIT
LOC/REM
INHIBITO
LOC/REMO
RESETO
OPERO
POWERO
STBO
C100
.001
S1
S2
S3
S4
POWER
STB
OPER
RESET
R30 270 PWR1
R32 270 STB1
R27 270 OP1
R28 270 FAULT1
SELADD1
SELADD2
SELADD3
REVPSEL
C101
SK1
SK2
SK3
SK4
UPB
DNB
SKSEL
STAT1
STAT2
STAT3
STAT4
STAT5
STAT6
STAT7
STAT8
STAT
S5
S6
S7
S8
S9
S10

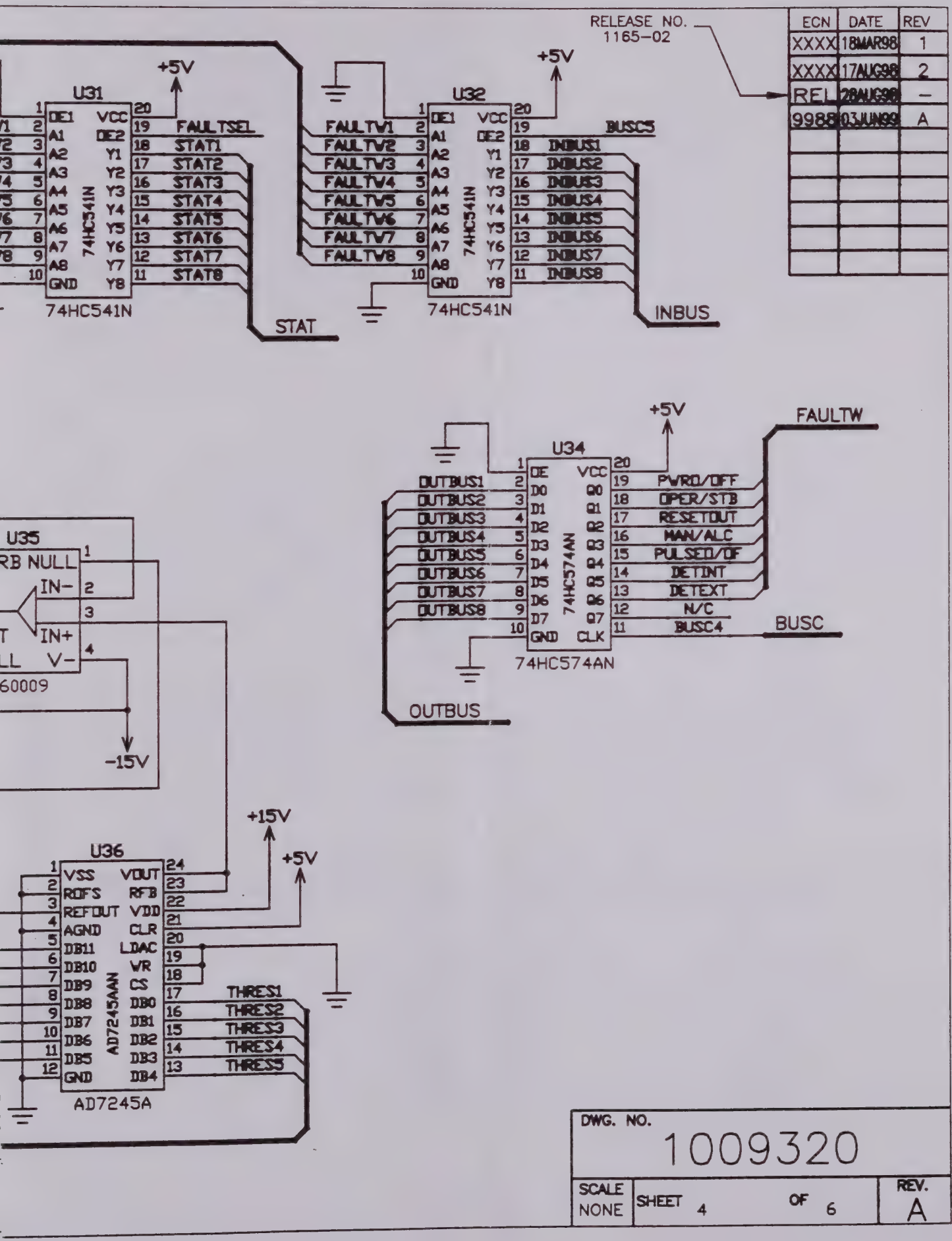

RELEASE NO. 1165-02
ECN | DATE | REV
XXXX | 18MAR98 | 1
XXXX | 17AUG98 | 2
REL | 28AUG98 | –
9988 | 03JUN99 | A
+5V
BUSC
INBUS
BUSC3
INBUS1
INBUS2
INBUS3
INBUS4
INBUS5
INBUS6
INBUS7
INBUS8
U6
PIC16C65-20/P
DMAN
DPULSE
DDET1
DDET2
LDC/REMO
INHIBITO
RD
WR
RS
DD1
DD2
DD3
DD4
STAT9
STAT10
STAT8
STAT7
STAT6
STAT5
STAT4
STAT3
STAT2
STAT1
CNTSEL1
CNTSEL2
SELADD3
SELADD2
DD8
DD7
DD6
DD5
SELADD1
STAT11
STAT
Y1
SKSEL
AULTSEL
RFGSEL
HRESSEL
ETGSEL
LCRSEL
WDPSEL
Y2
P4
GND
5VDC
N/C
RS
R/W
E
DA1
DA2
DA3
DA4
DA5
DA6
DA7
DA8
U9
PIC16C57-HS/P
TOCK1
VDD
VSS
MCLR/VPP
OSC1/CLKIN
OSC2/CLKOUT
UPBO
DNBO
CHANA
CHANB
LDC/REMO
COUNTCON
RFGENABLE
ENABLETHRES
ENABLEDETG
ENABLEALCR
U/D
CLK
P3
DWG. NO. 1009320
SCALE NONE
SHEET 2 OF 6
REV. A

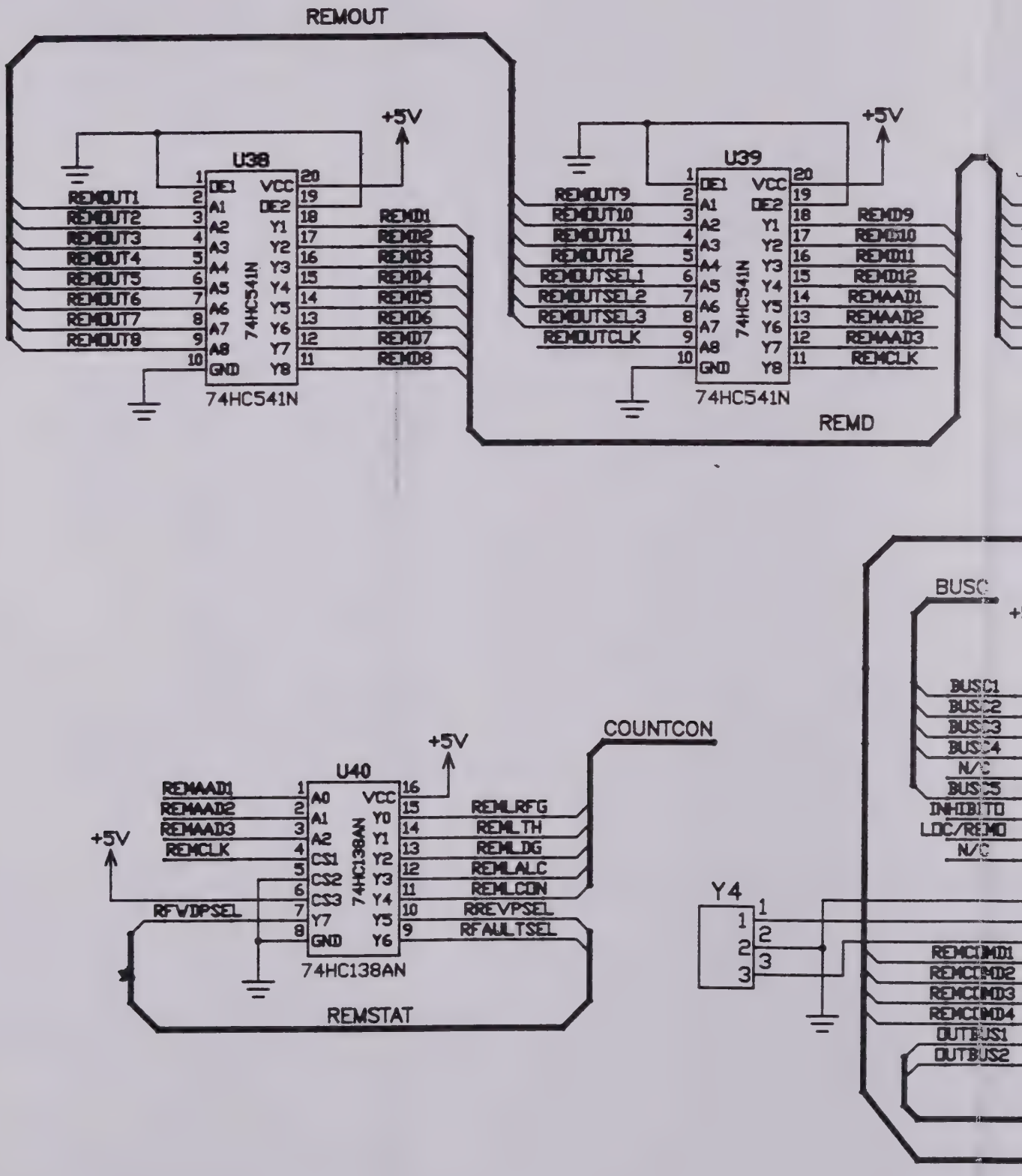

COUNTCON
STAT
U11
+5V
THRES5
THRES6
THRES7
THRES8
THRES9
THRES10
THRES11
THRES12
THRESSEL
STAT1
STAT2
STAT3
STAT4
STAT5
STAT6
STAT7
STAT8
74HC541N
U15
RFG5
RFG6
RFG7
RFG8
RFG9
RFG10
RFG11
RFG12
RFGSEL
COUNTCON
ALCRESOUT
DIGIPOT
U10
ALCR1
ALCR2
ALCR3
ALCR4
N/C
DPEN
DPDATA
DPCLK
ALCROUT1
ALCROUT2
ALCROUT3
ALCROUT4
DIGITEN
DIGIDAT
DIGICLK
U25
MMDG1
MMDG2
DETGSTOP
DETGOVER
DETGAND
DETGOVER
THRESTOP
THOVER
THAND
MM74HC11
DETG4
U/D
DETGSTOP
ALCR4
ALCRSTOP
U14
MMALC1
ALCOVER
ALCRSTOP
ALCOVER
ALCRAND
U13
REMD2
ALCR2
ALCR1
ENALCR
U/D
ALCR3
ALCR4
REMD1
CLK
N/C
MMALC1
REMLALC
REMD3
REMD4
74HC191N
REMD10
THRES10
THRES9
ENTHRES
U/D
THRES11
THRES12
U17
REMD6
DETG6
DETG5
ENDETG
U/D
DETG7
DETG8
REMD5
DGRIPC1
N/C
MMDG2
REMLDG
REMD7
REMD8
U21
DETG2
DETG1
ENDETG
U/D
DETG3
DETG4
DGRIPC1
MMDG1
RFG10
RFG9
ENGRF
RFG11
RFG12
COUNTC



DWG. NO.		
1009320		
SCALE NONE	SHEET 3 OF 6	REV. A

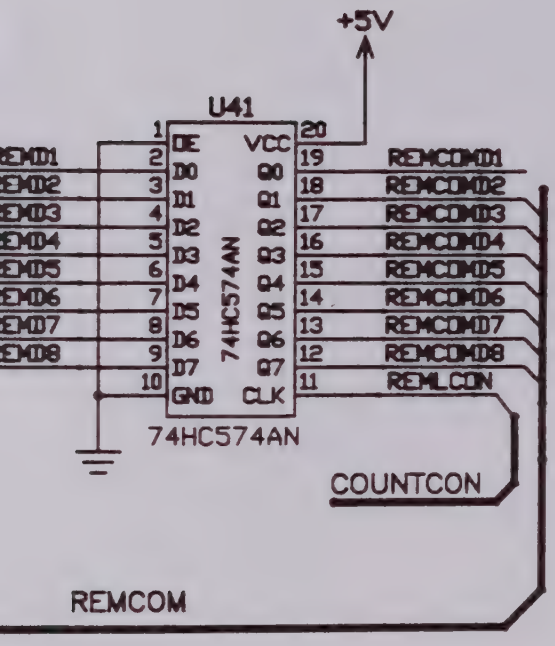

FAULTW
+15V
U29
STRB NULL
V+
IN-
RFGAIN ADJ
OUT
IN+
NULL
V-
60009
R1
10K
-15V
U30
+5V
FAULTW1
FAULTW2
FAULTW3
FAULTW4
FAULTW5
FAULTW6
FAULTW7
FAULTW8
74HC541N
RFAULTSEL
REMSTAT
+15V
+5V
U33
VSS
RDFS
REFOUT
AGND
DB11
DB10
DB9
DB8
DB7
DB6
DB5
GND
VOUT
RFB
VDD
CLR
LDAC
WR
CS
DB0
DB1
DB2
DB3
DB4
AD7245AAN
AD7245A
R25
10
C107
C108
0.1
2.2
RFG12
RFG11
RFG10
RFG9
RFG8
RFG7
RFG6
RFG1
RFG2
RFG3
RFG4
RFG5
+15V
THRESH/ ADJ
R2
10K
COUNTCON
Y3
+5V
+5V
U37
TOCK1
VDD
N/C
N/C
VSS
N/C
RA0
RA1
RA2
RA3
RB0
RB1
RB2
RB3
RB4
MCLR/VPP
OSC1/CLKIN
OSC2/CLKOUT
RC7
RC6
RC5
RC4
RC3
RC2
RC1
RC0
RB7
RB6
RB5
PIC16C57-HS/P
N/C
N/C
DPEN
DPDATA
DPCLK
F/RSEL
PR/C
PWRSTAT
FWDPSEL
REVPSEL
RFWDPSEL
DETG8
DETG7
DETG6
DETG5
DETG4
DETG3
DETG2
DETG1
PWRSTSEL
PRREMSEL
RREVPSEL
PIC16C57-HS/P
R26
10
C109
C110
0.1
2.2

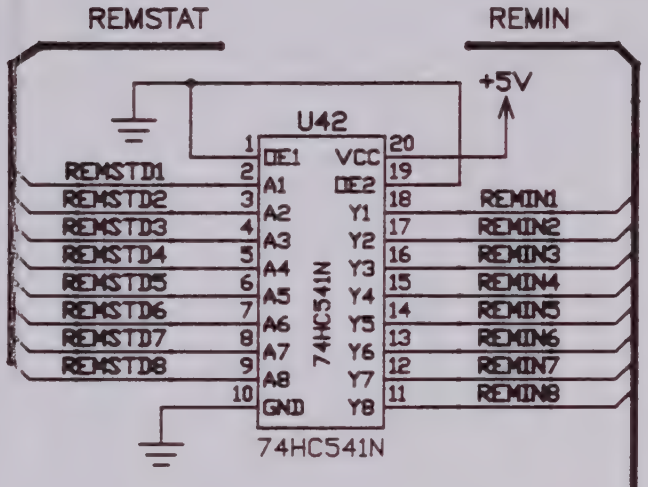

RELEASE NO.
1165-02
ECN | DATE | REV
XXXX | 18MAR98 | 1
XXXX | 17AUG98 | 2
REL | 28AUG98 | –
9988 | 03JUN99 | A
U31
74HC541N
+5V
FAULTSEL
STAT1
STAT2
STAT3
STAT4
STAT5
STAT6
STAT7
STAT8
STAT
U32
74HC541N
+5V
BUSC5
INBUS1
INBUS2
INBUS3
INBUS4
INBUS5
INBUS6
INBUS7
INBUS8
INBUS
U34
74HC574AN
+5V
FAULTW
OUTBUS1
OUTBUS2
OUTBUS3
OUTBUS4
OUTBUS5
OUTBUS6
OUTBUS7
OUTBUS8
OUTBUS
PWRD/OFF
OPER/STB
RESETOUT
MAN/ALC
PULSED/DF
DETINT
DETEXT
N/C
BUSC4
BUSC
U35
RB NULL
IN-
IN+
V-
60009
-15V
U36
AD7245A
+15V
+5V
THRES1
THRES2
THRES3
THRES4
THRES5
DWG. NO.
1009320
SCALE
NONE
SHEET 4 OF 6
REV.
A

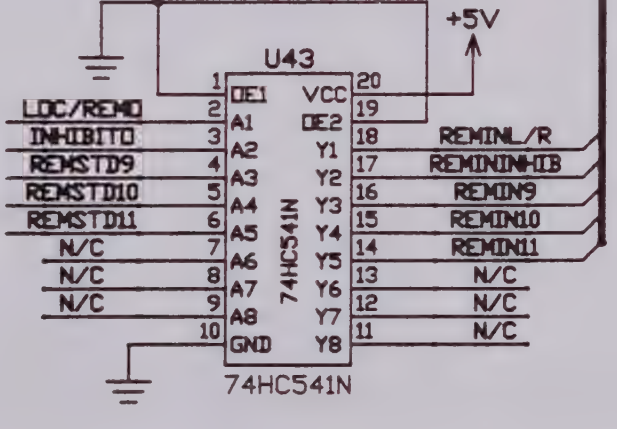

REMOUT
+5V
U38
74HC541N
REMOUT1
REMOUT2
REMOUT3
REMOUT4
REMOUT5
REMOUT6
REMOUT7
REMOUT8
REMD1
REMD2
REMD3
REMD4
REMD5
REMD6
REMD7
REMD8
U39
REMOUT9
REMOUT10
REMOUT11
REMOUT12
REMOUTSEL1
REMOUTSEL2
REMOUTSEL3
REMOUTCLK
REMD9
REMD10
REMD11
REMD12
REMAAD1
REMAAD2
REMAAD3
REMCLK
REMD
U40
74HC138AN
REMAAD1
REMAAD2
REMAAD3
REMCLK
RFVIDPSEL
COUNTCON
REMLRFG
REMLTH
REMLDG
REMLALC
REMLCON
RREVPSEL
RFAULTSEL
REMSTAT
BUSC
BUSC1
BUSC2
BUSC3
BUSC4
N/C
BUSC5
INHIBITO
LDC/REMO
N/C
Y4
REMCMD1
REMCMD2
REMCMD3
REMCMD4
OUTBUS1
OUTBUS2

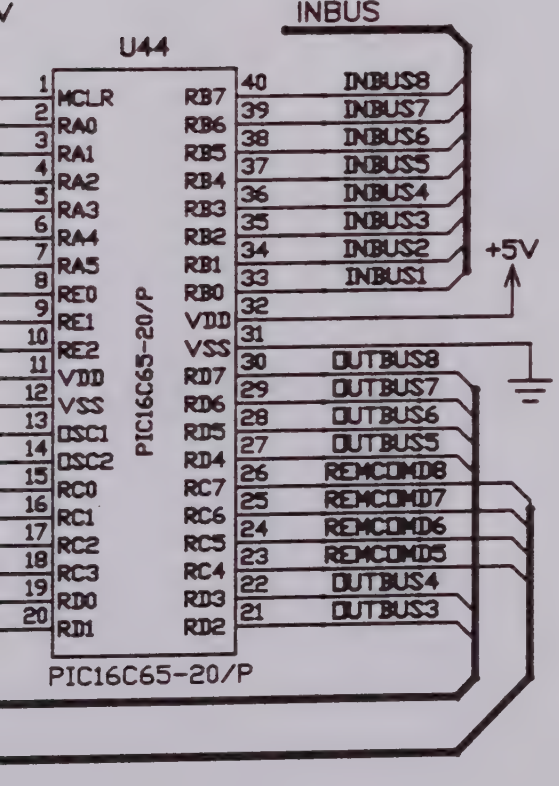
ECN	DATE	REV
XXXX	18MAR98	1
XXXX	17AUG98	2
REL	28AUG98	–
9988	03JUN99	A

RELEASE NO.
1165–02

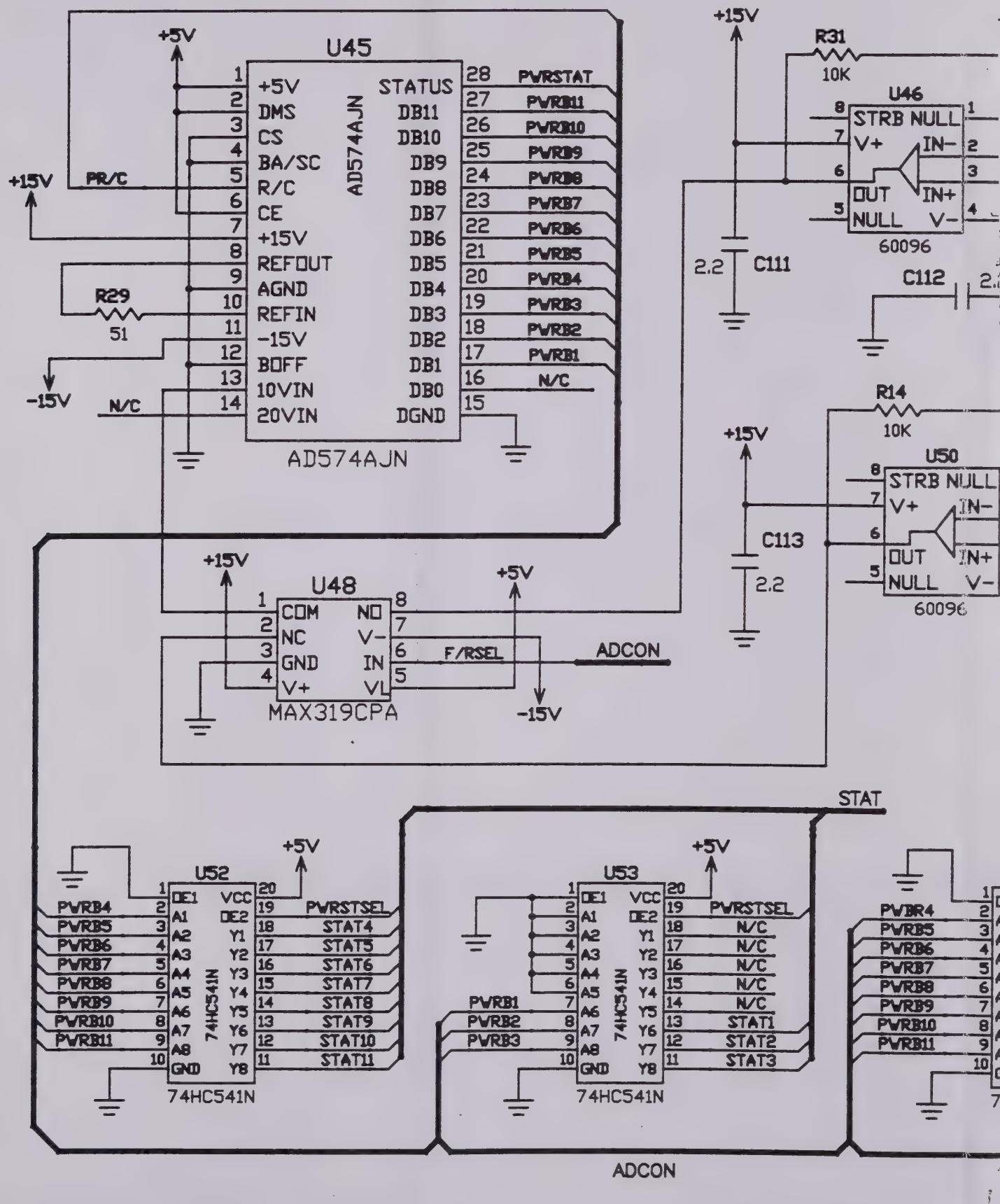


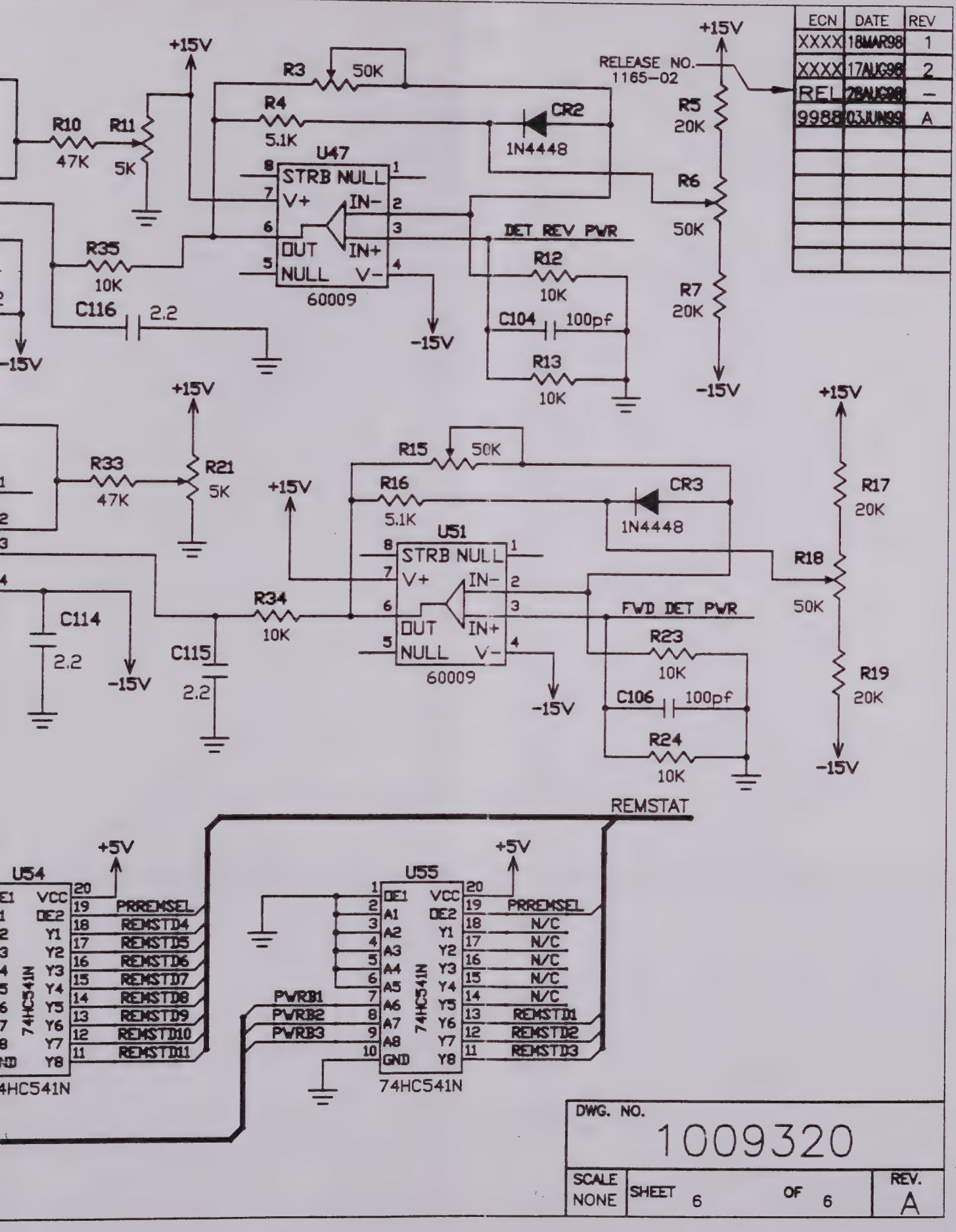


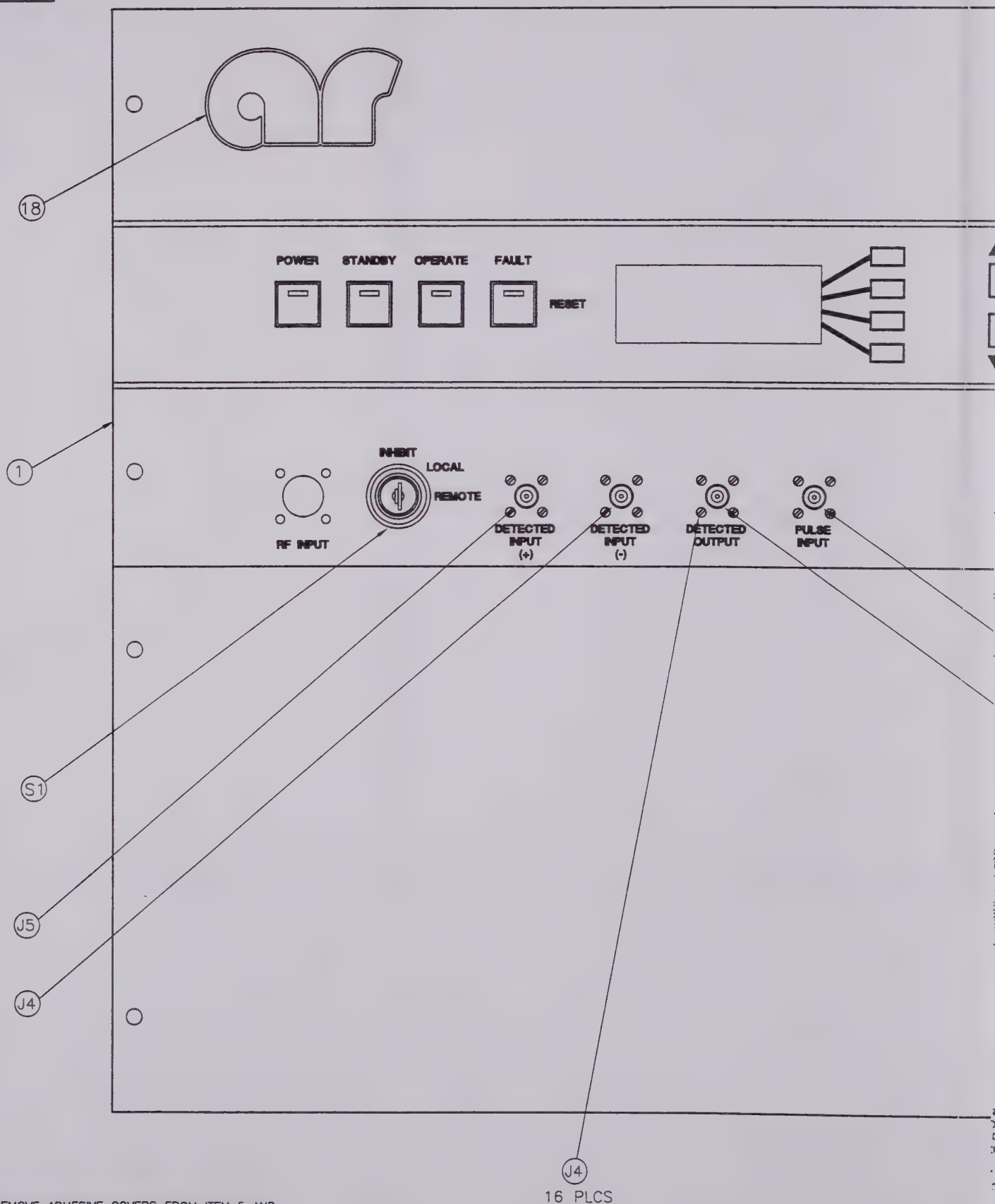




DWG. NO.		
1009320		
SCALE NONE	SHEET 5 OF 6	REV. A


U45
AD574AJN
+5V
DMS
CS
BA/SC
R/C
CE
+15V
REFOUT
AGND
REFIN
-15V
BOFF
10VIN
20VIN
STATUS
DB11
DB10
DB9
DB8
DB7
DB6
DB5
DB4
DB3
DB2
DB1
DB0
DGND
PVRSTAT
PVRB11
PVRB10
PVRB9
PVRB8
PVRB7
PVRB6
PVRB5
PVRB4
PVRB3
PVRB2
PVRB1
N/C
PR/C
R29
51
R31
10K
U46
STRB NULL
V+
IN-
OUT
IN+
NULL
V-
60096
C111
2.2
C112
R14
U50
C113
U48
COM
NC
GND
V+
NO
V-
IN
VL
F/RSEL
ADCON
MAX319CPA
STAT
U52
U53
74HC541N
DE1
DE2
A1
A2
A3
A4
A5
A6
A7
A8
GND
VCC
Y1
Y2
Y3
Y4
Y5
Y6
Y7
Y8
PVRSTSEL
STAT4
STAT5
STAT6
STAT7
STAT8
STAT9
STAT10
STAT11
STAT1
STAT2
STAT3

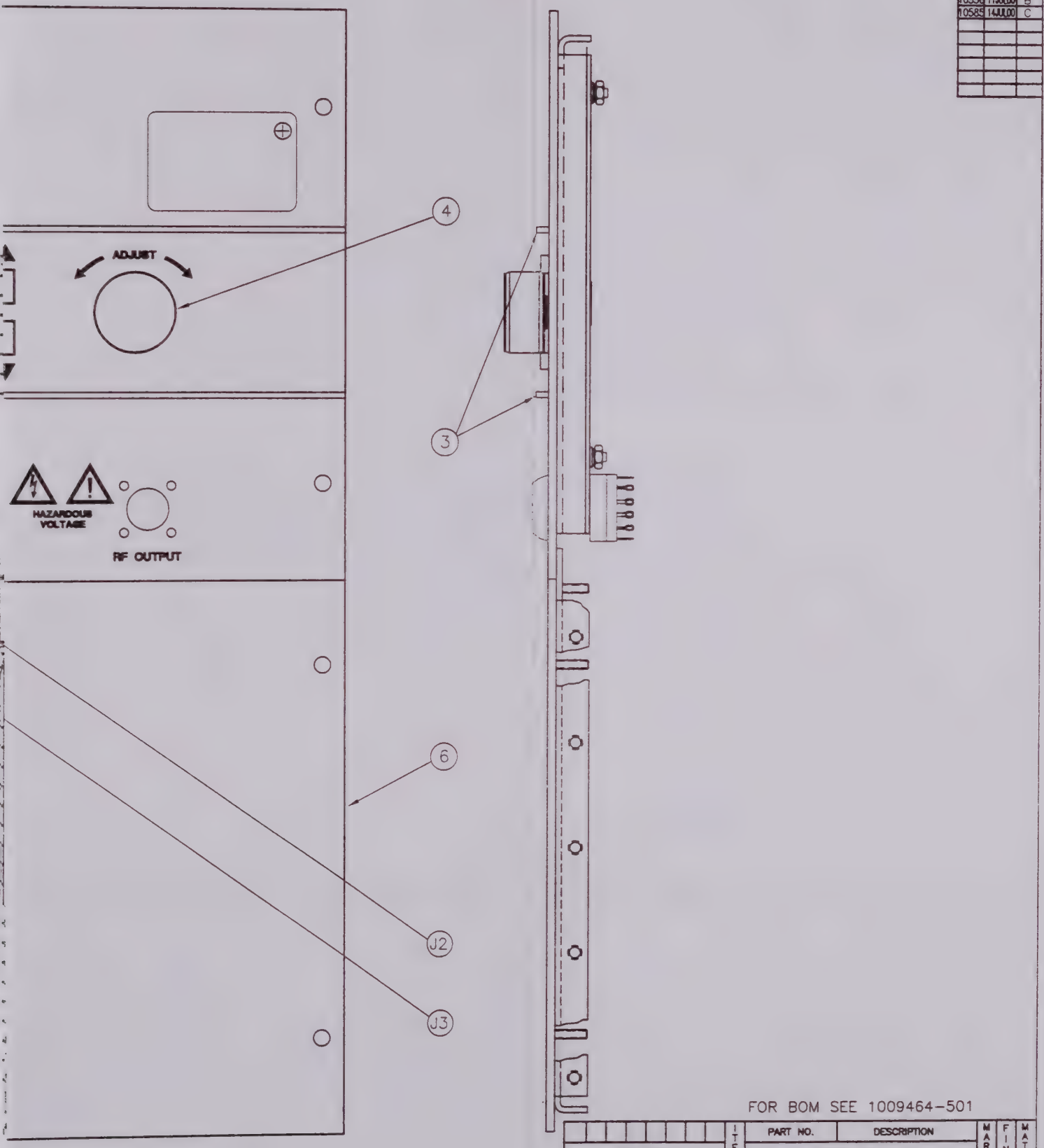

ECN DATE REV
XXXX 18MAR98 1
XXXX 17AUG98 2
REL 28AUG98 –
9988 03JUN99 A
RELEASE NO. 1165-02
+15V
R3 50K
R4 5.1K
CR2 1N4448
R5 20K
R6 50K
R7 20K
R10 47K
R11 5K
U47
STRB NULL
V+
IN-
OUT
IN+
NULL
V-
60009
DET REV PWR
R12 10K
C104 100pf
R13 10K
R35 10K
C116 2.2
-15V
R15 50K
R16 5.1K
CR3 1N4448
R17 20K
R18 50K
R19 20K
R21 5K
R33 47K
U51
FWD DET PWR
R23 10K
C106 100pf
R24 10K
R34 10K
C114 2.2
C115 2.2
REMSTAT
+5V
U54
U55
74HC541N
PRREMSEL
REMSTD4
REMSTD5
REMSTD6
REMSTD7
REMSTD8
REMSTD9
REMSTD10
REMSTD11
PWRB1
PWRB2
PWRB3
N/C
REMSTD1
REMSTD2
REMSTD3
DWG. NO.
1009320
SCALE NONE
SHEET 6 OF 6
REV. A



NOTES:
1.0 REMOVE ADHESIVE COVERS FROM ITEM 5 AND INSTALL IN ITEM 1 AS SHOWN IN SECTION D–D

REL NO. 1196-03

ECN	DATE	REV
REL	26MAY99	–
10126	15SEP99	A
10536	11JUL00	B
10585	14JUL00	C



FOR BOM SEE 1009464-501

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

DRAWN A.REED DATE 3/31/98
CHKD A.REED DATE 26 MAY 99
MECH J.MAGINN DATE 22 DEC 98
ELEC F.SCHIRK DATE 21 DEC 98

100S1G4 USED ON MODEL

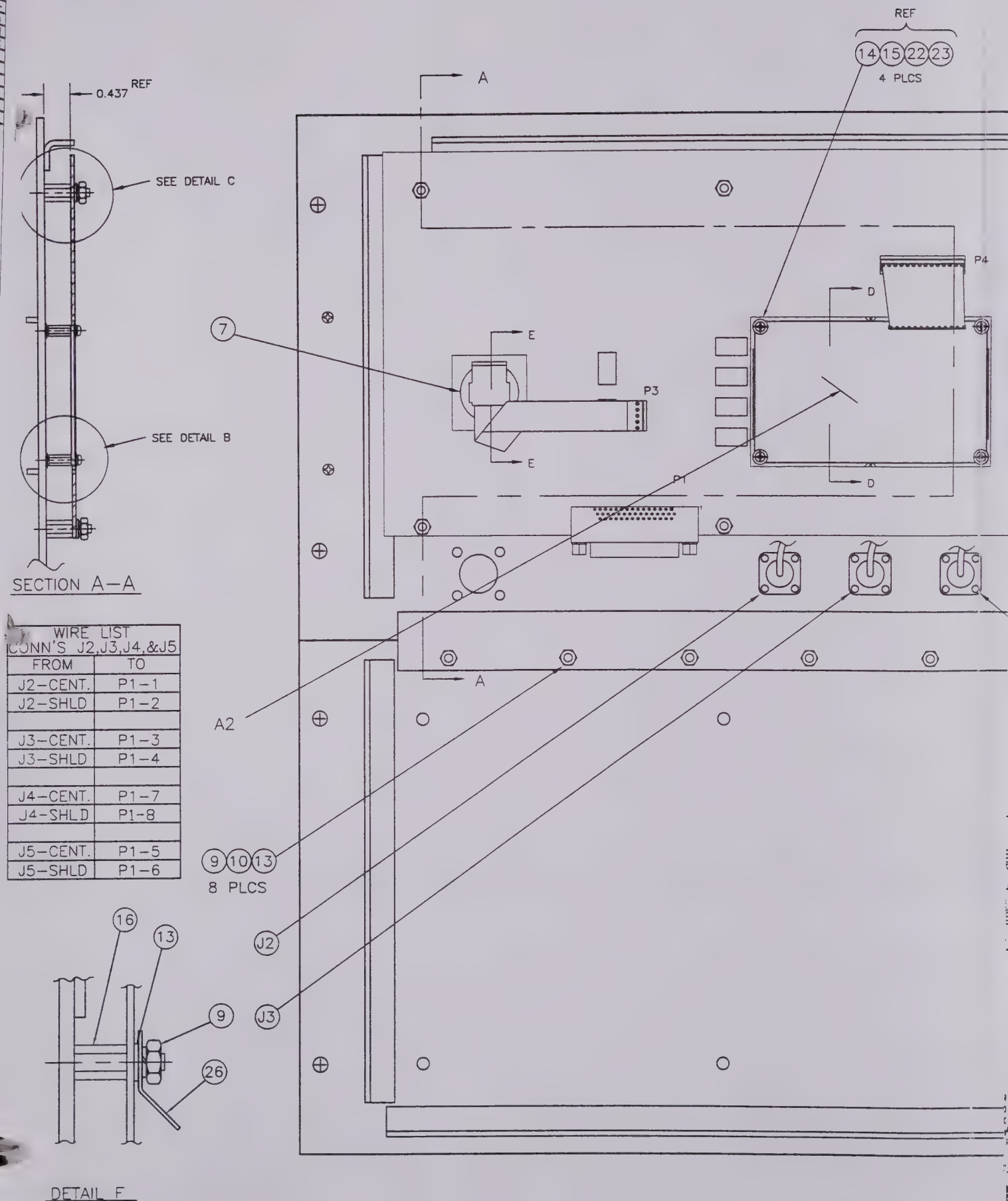
AMPLIFIER RESEARCH

CTRL PANEL ASSY

DWG. NO. 1009464

SCALE 1/1 SHEET 1 OF 2 REV. C

SHEET	1	2
REV	C	C



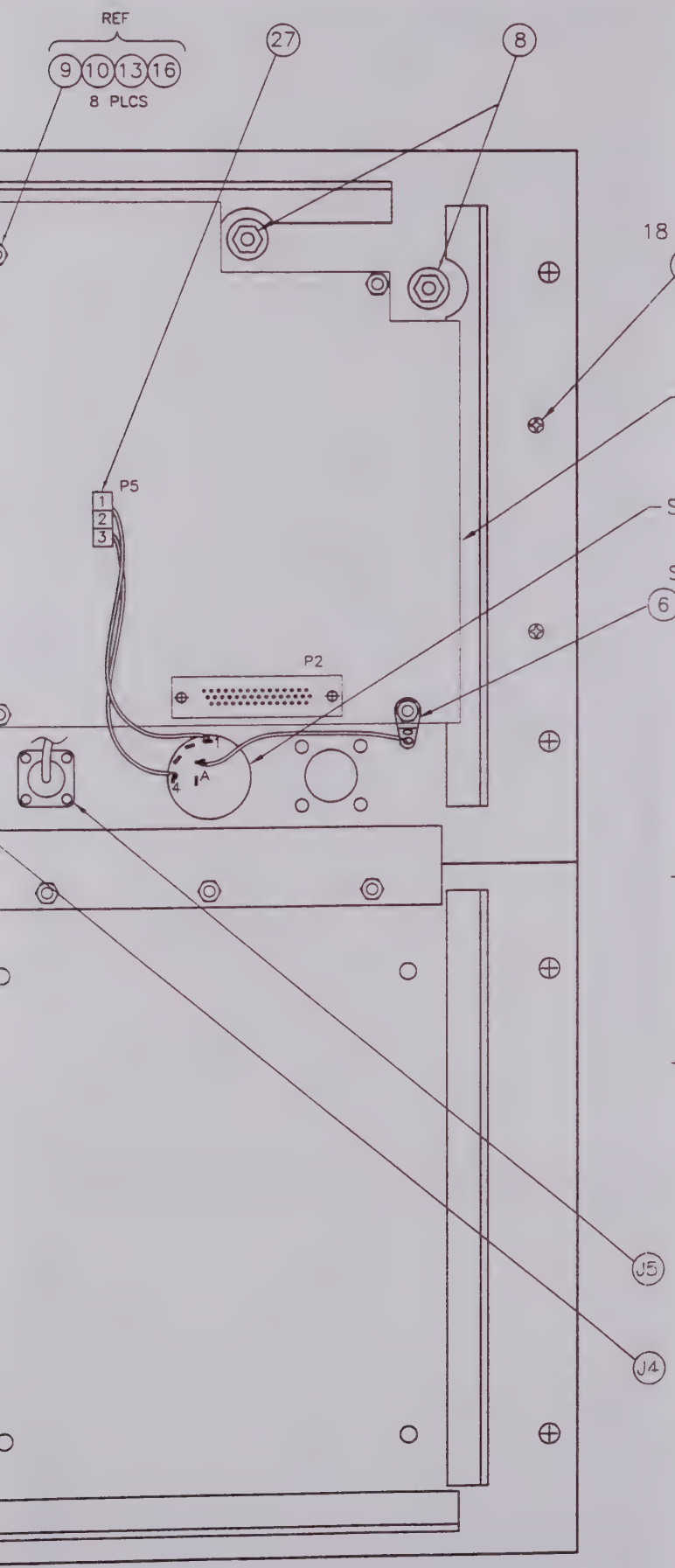
SECTION A–A

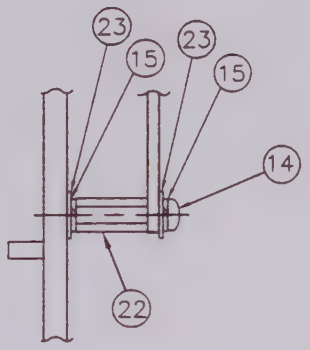
WIRE LIST CONN'S J2,J3,J4,&J5	
FROM	TO
J2–CENT.	P1–1
J2–SHLD	P1–2
J3–CENT.	P1–3
J3–SHLD	P1–4
J4–CENT.	P1–7
J4–SHLD	P1–8
J5–CENT.	P1–5
J5–SHLD	P1–6

DETAIL F

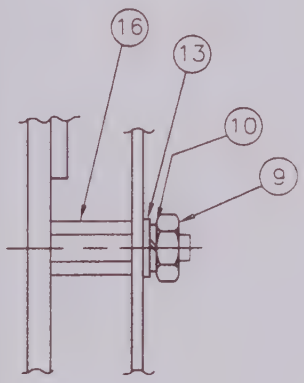
REL NO. 1196-03

ECN	DATE	REV
REL	26MAY99	—
10126	15SEP99	A
10536	11JUL00	B
10585	14JUL00	C

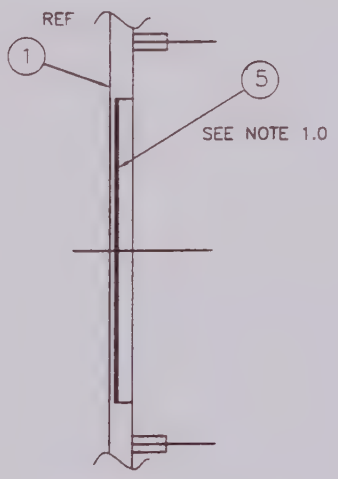




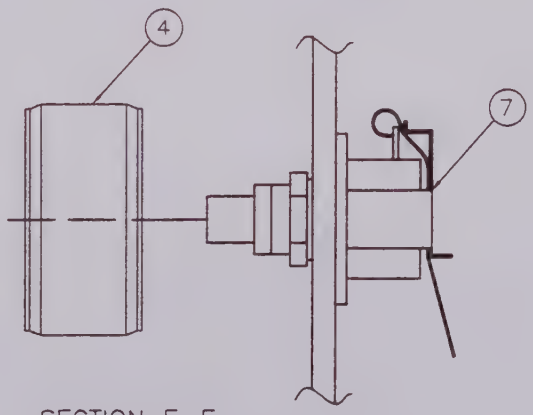
DETAIL B
TYP 4 PLACES



DETAIL C
TYP 8 PLACES



SECTION D-D
SCALE 2/1



SECTION E-E
SCALE 2/1

DWG. NO.		
1009464		
SCALE 1/1	SHEET 2 OF 2	REV. C

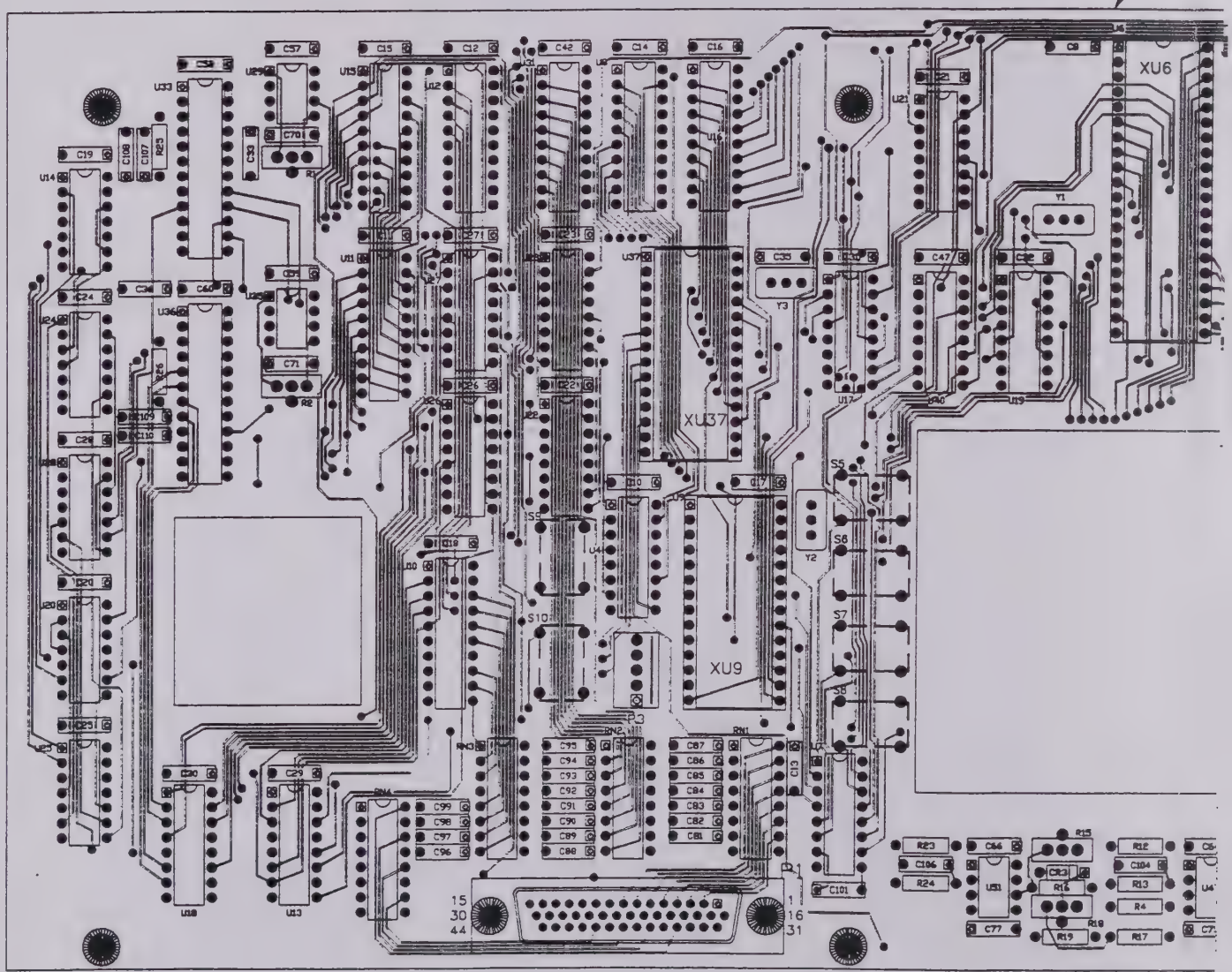
BILL NO: 1010933-501 REV: A U/M: EA DRAWING NO: ARC-D\1009464
CTRL PNL ASSY

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
)010	1009464	C	ASSY DWG,CTRL PNL	EA	REF	ARC-D\1009464	
)020	1010688	D	WIRE LIST,FRONT PNL	EA	REF	ARC-A\1010688	
)100	1009318-502	E	PWB ASSY,CONTROLLER/4 LINE DISPLAY	EA	1.000	ARC-D\1009318	A1
)110	1009903-501	A	DISPLAY ASSY	EA	1.000	ARC-B\1009903	A2
)115	1010934-501	-	ASSY,CONTROLLER,4LD,120S1G3	EA	1.000		A1U6
)120	1009890-501	-	ASSY,CONTROLLER,4LD,KNOB	EA	1.000		A1U9
)130	1009888-501	-	ASSY,CONTROLLER,4LD,A-D	EA	1.000		A1U37
)140	1010936-501	-	ASSY,CONTROLLER,CON,120S1G3	EA	1.000		A1U44
1500	41131		CONN,RECEPT,W/EARS & DETENT LOCK,9 CKT,M	EA	1.000	MOL\03-09-1092	J1
1505	41299		TERM,.093 DIA,CRIMP,TYPE F,24-30AWG	EA	4.000	MOL\02-09-1144	J1
1510	41105		TERM,.093 DIA,CRIMP TYPE,F,18-22 AWG	EA	4.000	MOL\02-09-1119	J1
1520	20141	-	CABLE ASSY,COAX,RG-188A/U,BNC PNL,8.0	EA	4.000	ARC-A\1002494	J2 ,J3 J4 ,J5
2200	41334		CONN,PLUG,3 PIN,(F),.10 CTR	EA	1.000	PNT\CT100F22-3	P5
3100	57100		SW,KEYLOCK,SP3POS,W/HEX NUT & TRIM WASHER	EA	1.000	CKS\A115132A1SZRB	S1
4200	66025		WIRE,TFE,22 AWG,STRANDED,TYPE E,BLK	IN	A/R		W1
4210	66034		WIRE,TFE,22 AWG,STRANDED,TYPE E,WHT	IN	A/R		W2 ,W3
5000	1009463-301-F1-M1	B	PNL,CTRL,100S1G4	EA	1.000	ARC-D\1009463	1
5020	1008867-101-F2	A	RAIL,TRIM	EA	2.000	ARC-C\1008867	3
5030	69392		KNOB,KNURLED,BLACK,1 1/4 DIA,1/4 SHAFT	EA	1.000	ALC\KN-1251B-1/4	4
5040	1009455-101	B	FILTER,AMBER,4 LINE DISPLAY	EA	1.000	ARC-B\1009455	5
5050	1009490-301-F1	-	PNL,CTRL,BOT,100S1G4	EA	1.000	ARC-D\1009490	6
5060	60107		OPTICAL ENCODER,MINIATURE,PNL MOUNT	EA	1.000	H-P\HRPG-ASCA#16C	7
5070	14001	-	FASTENER,PALNUT,WASH TYPE,SELF THDG	EA	2.000	TRW\SD188009-SOH	8
5080	13004		NUT,HEX,S/S,6-32,.250AF	EA	16.000		9

BILL NO: 1010933-501 REV: A U/M: EA DRAWING NO: ARC-D\1009464
CTRL PNL ASSY

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
5090	12048		WASH,LOCK,SPLIT,S/S,#6	EA	16.000	\MS35338-136	10
5120	12011		WASH,FLAT,S/S,#6,.312 OD X .156 ID X .035 THK	EA	16.000	\MS15795-805	13
5130	11099		SCREW,MACH,PAN HD,CROSS-REC,S/S,2-56 X .25	EA	4.000	\MS51957-3	14
5140	12005		WASH,LOCK,SPLIT,S/S,#2	EA	8.000	\MS35338-134	15
5150	14057		SPACER,RND,THD,F,B,.250 OD x .312LG x 6-32	EA	8.000	UNC\P517M01F21	16
5170	1006361-101	A	LOGO,DIECAST,1.50	EA	1.000	ARC-B\1006361	18
5180	11100		SCREW,MACH,FLT HD,100 DEG,CROSS-REC,S/S,2-56X.25	EA	18.000		19
5210	15008		SPACER,HEX,THD,F,A,.156 HEX X .375 LG X 2-56	EA	4.000	KEY\1797D	22
5220	12074		WASH,FLAT,S\S#2,.219 OD X .092 ID X .018 THK	EA	8.000		23
5240	11008		SCREW,MACH FIL HD,SLOTTED,S/S,3-56 X .25	EA	16.000	PCI\AN501-D3-4	25
5250	69100		LUG,SHAKEPROOF,BENT,41/64 L,#6 STUD,DUAL HOLE	EA	1.000	HHS\1416-6	26
5260	41336		CONN,COVER,END,3 POS,.10 CNTRS	EA	1.000	PNT\EC100F-3-Q	27

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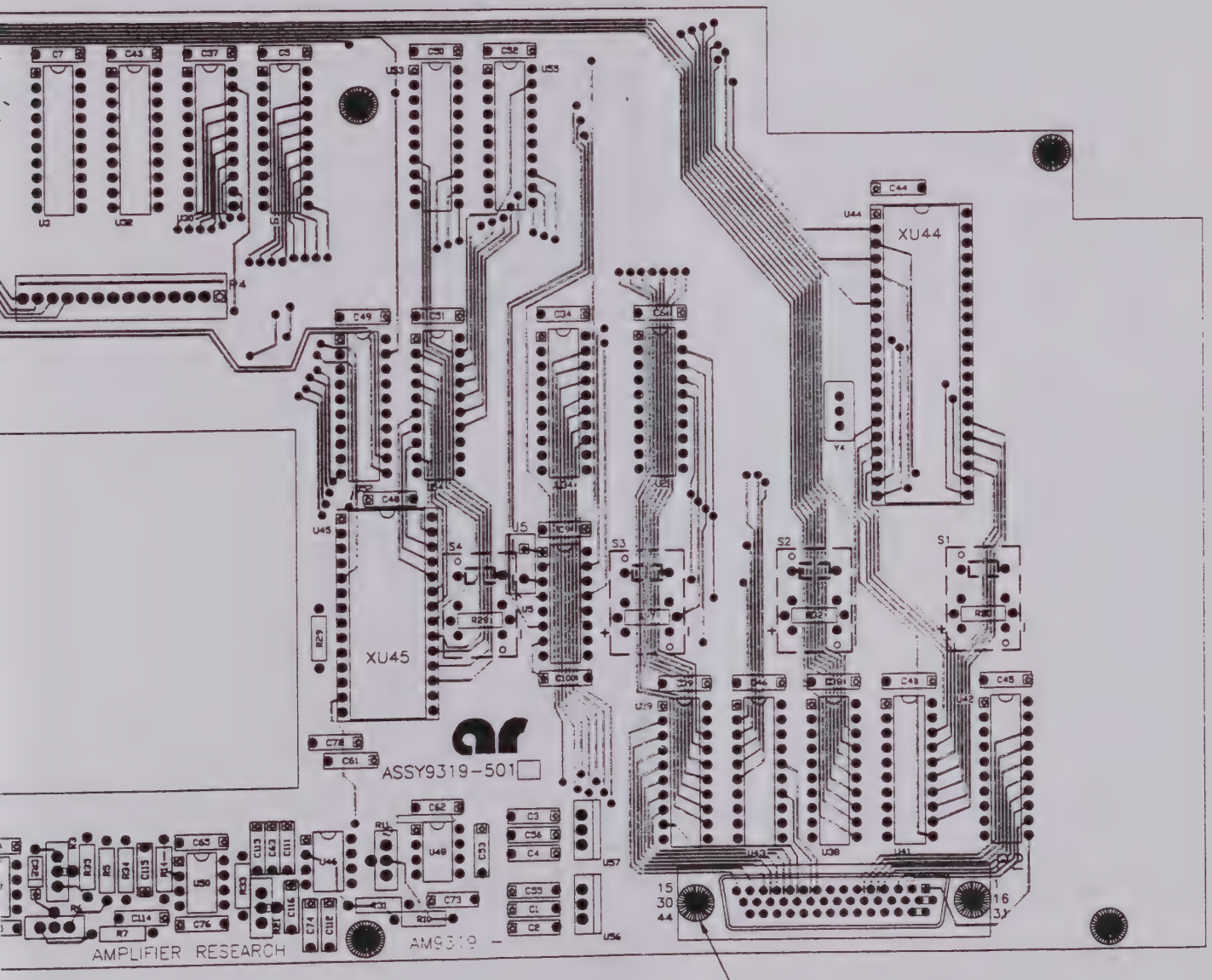


NOTES:

1.0 SWITCHES S1 THRU S10 ARE MOUNTED ON CIRCUIT SI
2.0 DISPLAY UNIT PLUGS INTO P4 ON COMPONENT SIDE O
3.0 SOCKETS ARE REQUIRED ONLY AT U8,U9,U37,U44, ANE
4.0 SOLDER FARSIDE ONLY, EXCEPT S1 THRU S10,USING I
5.0 WASH BOARDS BEFORE INSTALLING S1 THRU S10.
6.0 DO NOT CUT LEADS ON P1 AND P2.
7.0 REMOVE CENTER PIN FROM J5, AND TRIM TO FIT NEX
PRIOR TO INSTALLATION, IF REQUIRED.

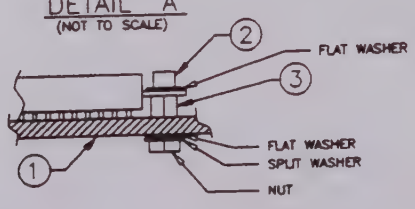
ECN	DATE	REV
REL	21AUG98	–
9653	11NOV98	A
9719	04JAN99	B
9830	22MAR99	C
9910	27APR99	D
9968	03JUN99	E
10186	04OCT99	F

RELEASE NO.
1165-02



(2)(3) 4 PLCS. SEE DETAIL "A"

DETAIL "A"
(NOT TO SCALE)



DE OF BOARD.
F BOARD.
) U46.
ENIMAL HEAT.

TO U5.

FOR BOM SEE: 1009318-501

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SCREW, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.05	±.015

ANGULAR DIMENSIONS ±1/2°

USED ON MODEL
100S1G4
500A100A

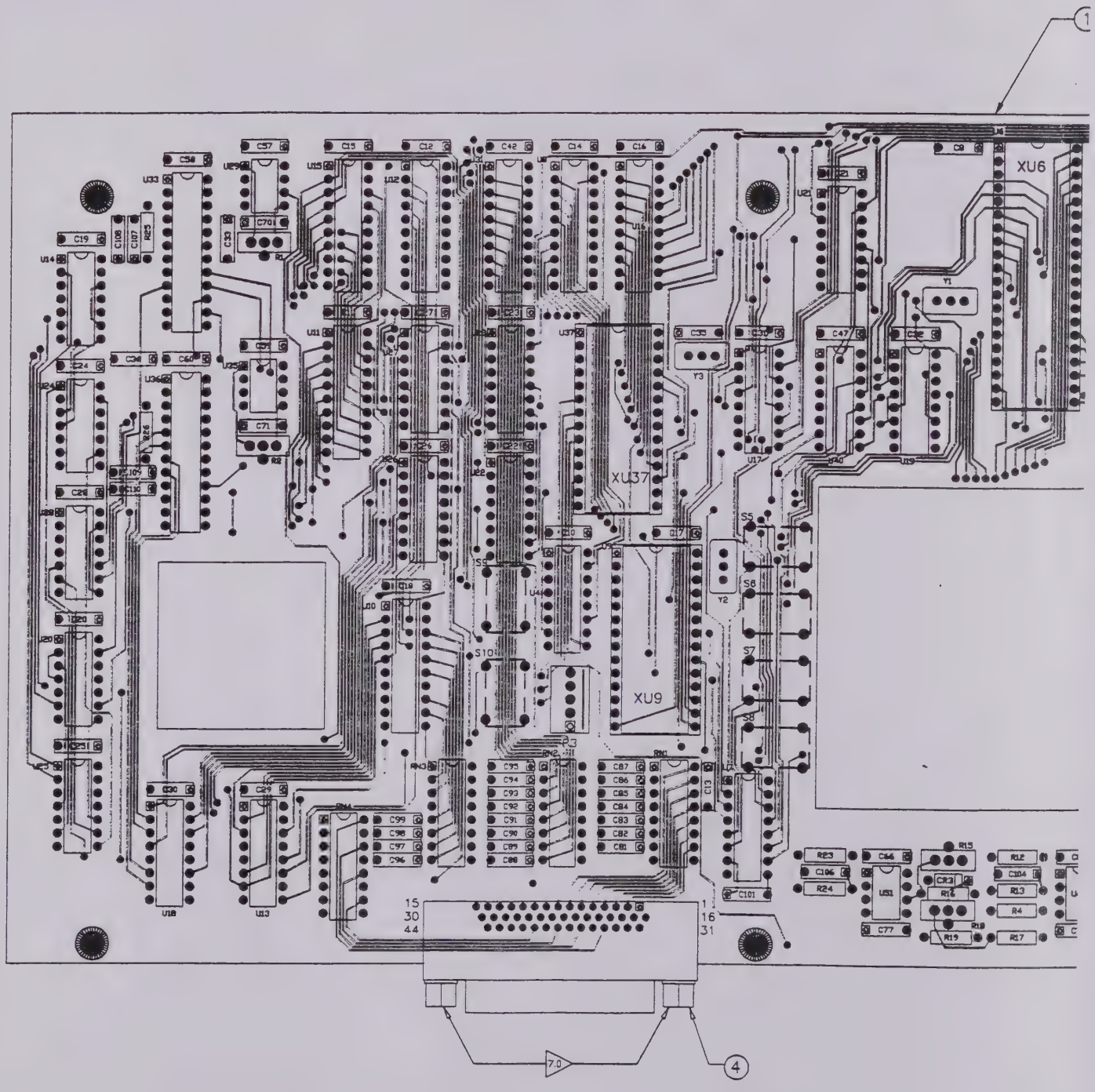
DRAWN J.H.REED DATE 29 MAY 98
CHKD J.H.REED DATE 21 AUG 98
MECH J.MAGINN DATE 28 AUG 98
ELEC J.W.CATON DATE 28 AUG 98

AMPLIFIER RESEARCH

ASSEMBLY DRAWING
CONTRLR./4 LINE DISPLAY

DWG. NO. 1009318

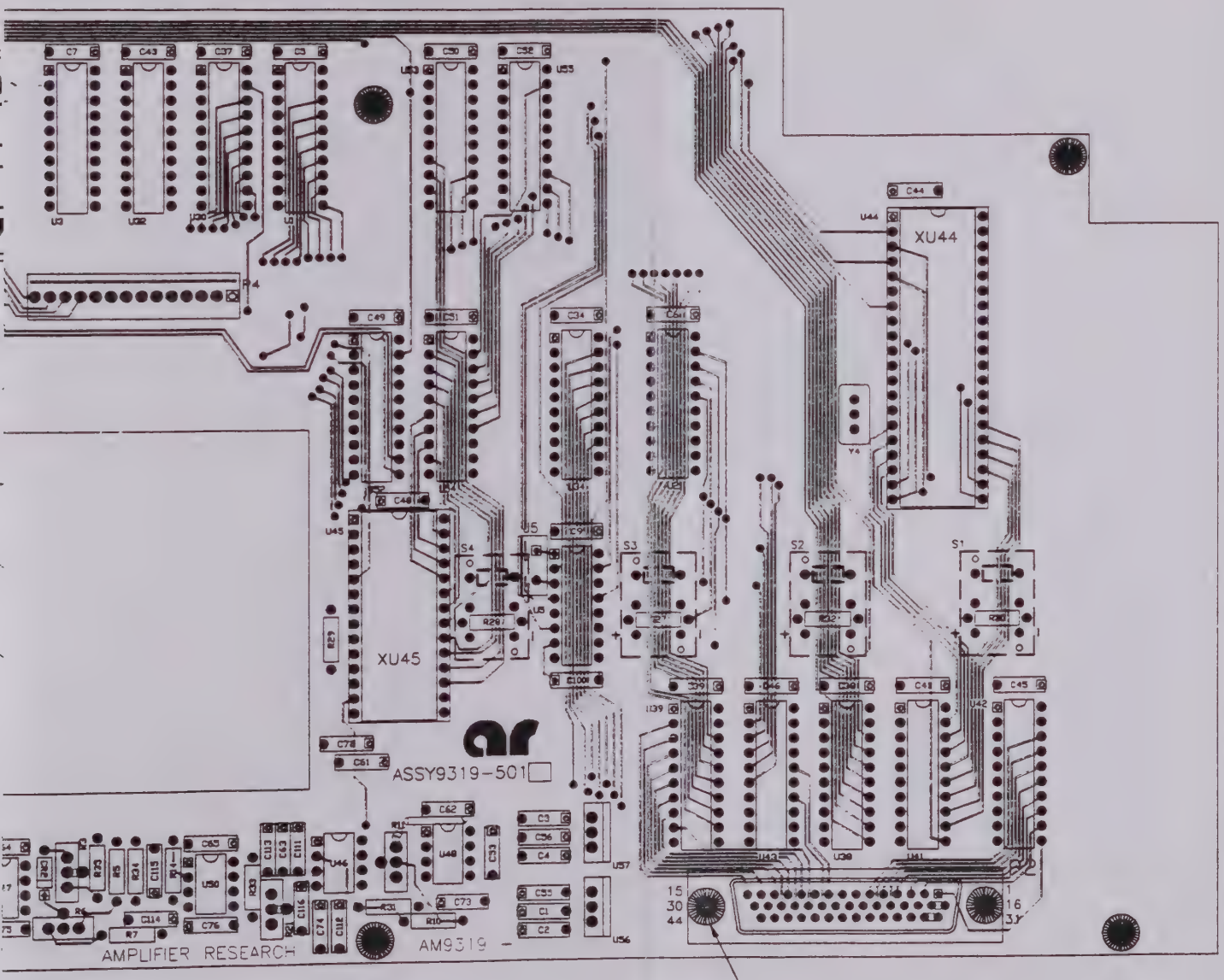
SCALE 2/1 SHEET 1 OF 2 REV. F



NOTES:

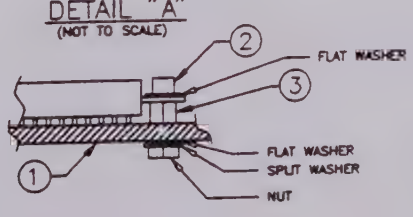
1.0 SWITCHES S1 THRU S10 ARE MOUNTED ON CIRCUIT
2.0 DISPLAY UNIT PLUGS INTO P4 ON COMPONENT SIDE
3.0 SOCKETS ARE REQUIRED ONLY AT U6,U9,U37,U44, AI
4.0 SOLDER FARSIDE ONLY, EXCEPT S1 THRU S10,USING
5.0 WASH BOARDS BEFORE INSTALLING S1 THRU S10.
6.0 DO NOT CUT LEADS ON P1 AND P2.
7.0 USE SCREWLOCK AND ONE WASHER EACH, DISCARD
8.0 REMOVE CENTER PIN FROM J5, AND TRIM TO FIT ME PRIOR TO INSTALLATION, IF REQUIRED.

RELEASE NO. 1165-02	DCN	DATE	REV
	REL	21AUG95	—
	9653	11NOV95	A
	9719	04JAN96	B
	9833	27MAR96	C
	9911	27AUG96	D
	9965	13JUN96	E
	10188	24OCT96	F



(2)(3) 2 PLCS, SEE DETAIL "A"

DETAIL "A"
(NOT TO SCALE)



SIDE OF BOARD.
OF BOARD.
ND U46.
MINIMAL HEAT.

OTHER PARTS.
KT TO US.

FOR BOM SEE: 1009318-502

DWG. NO. 1009318		
SCALE 2/1	SHEET 2 OF 2	REV. F

BILL NO: 1009318-501 REV: E U/M: EA DRAWING NO: ARC-D\1009318
PWB ASSY,CONTROLLER/4 LINE DISPLAY

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1009320	A	SCHEM DIAG,CONTROLLER/4 LINE DISPLAY	EA	REF	ARC-B\1009320	
0020	1009318	F	ASSY DWG,CONTROLLER/4 LINE DISPLAY	EA	REF	ARC-D\1009318	
0400	27236		CAPR,FXD,DIP SPACED CER,.1UF,50VDC	EA	71.000	AVX\MD015C104MAA	C1 ,C2 C3 ,C4 C5 ,C6 C7 ,C8 C9 ,C10 C11 ,C12 C13 ,C14 C15 ,C16 C17 ,C18 C19 ,C20 C21 ,C22 C23 ,C24 C25 ,C26 C27 ,C28 C29 ,C30 C31 ,C32 C33 ,C34 C35 ,C36 C37 ,C38 C39 ,C41 C42 ,C43 C44 ,C45 C46 ,C47 C48 ,C49 C50 ,C51 C52 ,C57 C58 ,C59 C60 ,C61 C62 ,C63 C64 ,C65 C66 ,C70 C71 ,C72 C73 ,C74 C75 ,C76 C77 ,C107 C109
0410	27229		CAPR,CER,2.2uF,50V	EA	11.000	\RPE210Z5U225Z050V	C53 ,C55 C56 ,C108 C110 ,C111 C112 ,C113 C114 ,C115 C116

BILL NO: 1009318-501 REV: E U/M: EA DRAWING NO: ARC-D\1009318
PWB ASSY,CONTROLLER/4 LINE DISPLAY

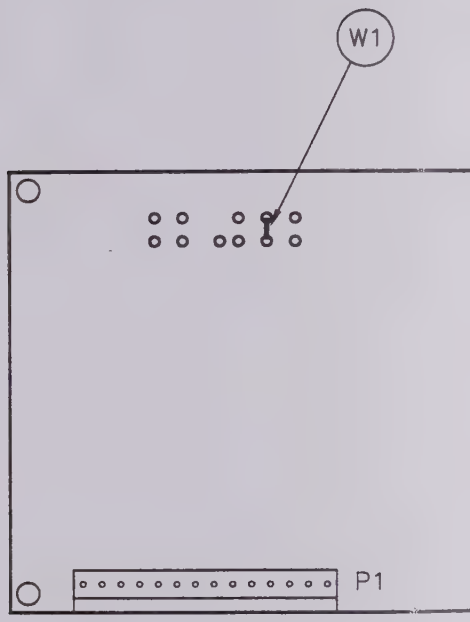
SEQ	PART NUMBER	REV	DESCRIPTION	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0420	27263		CAPR,FXD,DIP SPACED CER,.01uF,100V	EA	19.000	AVX\MD011C103KAB	C81 ,C82 C83 ,C84 C85 ,C86 C87 ,C88 C89 ,C90 C91 ,C92 C93 ,C94 C95 ,C96 C97 ,C98 C99
0430	27277		CAPR,FXD,DIP SPACED CER,.001uf	EA	2.000	AVX\MD015C102MAA	C100 ,C101
0450	27237		CAPR,FXD,DIP SPACED CER,100PF,50V	EA	2.000	AVX\MD015A101KAA	C104 ,C106
0700	1N4448		DIODE,SIGNAL,75V PIV	EA	2.000	FCH\1N4448	CR2 ,CR3
1500	41335		CONN,LOCKING HEADER,STR,3 PIN,.10 CNTRS	EA	1.000	PNT\MLSS100-3	J5
2200	41301		CONN,RECEPT,44 PIN,PC MOUNT	EA	2.000	SPC\HD-DSC-44S	P1 ,P2
2210	41293		CONN,5 PIN HEADER	EA	1.000	AMP\640454-5	P3
2220	41300		CONN,LOCKING HEADER,STRAIGHT,14 PIN	EA	1.000	AMP\1-640454-4	P4
2700	55919		RES,VAR,CERMET,MULTITURN,TOP ADJ,10K,10%,1/2W	EA	2.000	BOR\3299Y-1-103	R1 ,R2
2710	55922		RES,VAR,CERMET,MULTITURN,TOP ADJ,50K,10%,1/2W	EA	4.000	BOR\3299Y-1-503	R3 ,R6 R15 ,R18
2720	55612-5101J		RES,FXD,METAL FILM,5.1K,5%,1/4-/12W	EA	2.000	TRW/GP55-5101+/-5%	R4 ,R16
2730	55612-2002J		RES,FXD,METAL FILM,20K,5%,1/4-1/2W	EA	4.000	TRW\GP55-2002+/-5%	R5 ,R7 R17 ,R19
2740	55612-4702J		RES,FXD,METAL FILM,47K,5%,1/4-1/2W	EA	2.000	TRW\GP55-4702+/-5%	R10 ,R33
2750	55918		RES,VAR,CERMET,MULTITURN,TOP ADJ,5K,10%,1W	EA	2.000	MEP\8024EKW502	R11 ,R21
2760	55612-1002F		RES,FXD,PRECISION,10K,1%,1/4-1/2W,CHAR.D	EA	8.000	MFG\RN55D1002F	R12 ,R13 R14 ,R23 R24 ,R31 R34 ,R35
2770	55612-10R0F		RES,FXD,FILM,10 OHM	EA	2.000	\RN55D10R0F	R25 ,R26
2780	55612-2210F		RES,FXD,PRECISION,221,1%,1/4-1/2W,CHAR.D	EA	4.000	MFG\RN55D2210F	R27 ,R28 R30 ,R32

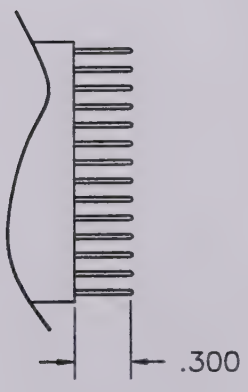
BILL NO: 1009318-501 REV: E U/M: EA DRAWING NO: ARC-D\1009318
PWB ASSY,CONTROLLER/4 LINE DISPLAY

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
2790	55612-51R0J		RES,FXD,METAL FILM,51,5%,1/4-1/2W	EA	1.000	TRW\GP55-51R0+/-5%	R29
2790	55945		RES,16 PIN DIP,100 OHM 1/4W	EA	4.000		RN1 ,RN2 RN3 ,RN4
3100	57095		SW,PB,MOMENTARY,W/GREEN LED,PWB MTG	EA	2.000	ITT\SEAUOA0125G	S1 ,S3
3110	57097		SW,PB,MOMENTARY,W/YELLOW LED,PWB MTG	EA	1.000	ITT\SEAUOA0125Y	S2
3120	57096		SW,PB,MOMENTARY,W/RED LED,PWB MTG	EA	1.000	ITT\SEAUOA0125R	S4
3130	57098		SW,PB,MOMENTARY,PWB MTG	EA	6.000	UNM\3FTL6	S5 ,S6 S7 ,S8 S9 ,S10
3140	57099		SW CAP,BLACK	EA	6.000	UNM\1P09	S5 ,S6 S7 ,S8 S9 ,S10
3700	60087		I.C.,INVERTING BUFFER	EA	19.000	NSI\MM74HC541N	U1 ,U3 U8 ,U10 U11 ,U12 U15 ,U16 U30 ,U31 U32 ,U38 U39 ,U42 U43 ,U52 U53 ,U54 U55
3710	60088		I.C.FLIP-FLOP	EA	3.000	NSI\MM74HCD574N	U2 ,U34 U41
3720	60076		IC/DECODER/DEMULTIPLEXER	EA	2.000	MOT\MC54/74HCT138A	U4 ,U40
3730	60101		IC,HEX CONTACT BOUNCE ELIMINATOR	EA	2.000	MOT\MC14490P	U5 ,U7
3760	60102		IC,SYNCHRONOUS BINARY UP/DOWN COUNTER	EA	9.000	NSI\MM74HC191	U13 ,U17 U18 ,U19 U21 ,U22 U23 ,U26 U27
3770	60105		IC,TRIPLE 3-INPUT AND GATE	EA	3.000	NSI\MM74HC11	U14 ,U25 U28
3780	60106		IC,QUAD 2-INPUT,EXCLUSIVE OR GATE	EA	1.000	NSI\MM74HC86	U20

BILL NO: 1009318-501 REV: E U/M: EA DRAWING NO: ARC-D\1009318
PWB ASSY,CONTROLLER/4 LINE DISPLAY

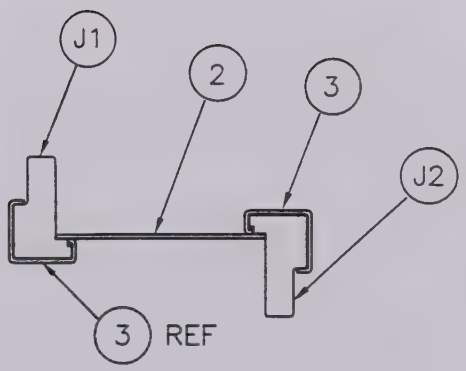
SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
3790	60104		IC,QUAD 2-INPUT OR GATE	EA	1.000	NSI\MM74HC32	U24
3800	60009		INTEGRATED CKT,LINEAR,OP.AMP.	EA	4.000	RCA\CA3140AE	U29 ,U35 U47 ,U51
3810	60103		IC,12-BIT DACPORT	EA	2.000	AND\AD7245A	U33 ,U36
3840	60109		IC,A/D CONVERTER,12 BIT	EA	1.000	AND\AD574AJN	U45
3850	60096		I.C.OP AMP	EA	2.000	NSI\LF351N	U46 ,U50
3860	60113	-	IC,CMOS ANALOG SWITCH,MAX319CPA	EA	1.000	MAX\MAX319CPA	U48
3870	60083		INTERGRATED CKT,3 TERM NEG REG,-12VDC	EA	1.000	NSI\LM7912CT	U56
3880	60084		INTERGRATED CKT,3 TERM REG POS REG,12VDC	EA	1.000	NSI\LM7812CT	U57
4500	73031		SOCKET,IC,40PIN	EA	2.000	TII\C93-40-02	XU6 ,XU44
4510	73033		SOCKET,IC,28 PIN	EA	3.000	TII\C93-28-02	XU9 ,XU37 XU45
4700	25057		OSC,XTAL 10MHZ	EA	2.000	ECS\ZTT-10.00MT	Y1 ,Y4
4710	25078		OSC,XTAL,4.0 MHz	EA	2.000	ECS\ZTT-4.00MG	Y2 ,Y3
5000	1009319-101	A	PWB,CONTROLLER/4 LINE DISPLAY	EA	1.000	ARC-D\1009319	1
5010	69262		SCREWLOCK KIT,F,USE WITH METAL SHELL"D"CONN	EA	2.000	AMP\207952-1	2
5020	14064		SPACER,HEX,THD,M-F,A,1/4 HEX X 3/8 LG,4-40	EA	4.000	SPC\TYPE 2713	3





DETAIL A

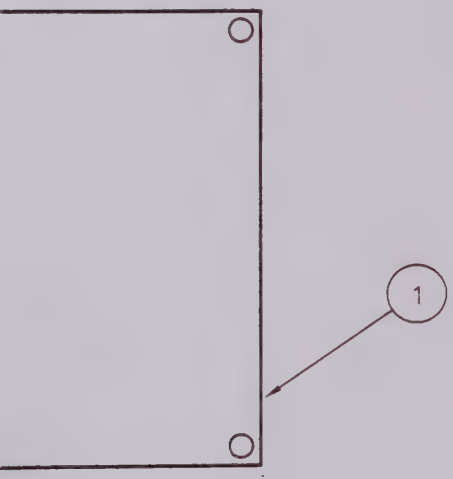
(NOT TO SCALE)



CABLE ASSEMBLY

(NOT TO SCALE)

ECN	DATE	REV
1165-01 REL	03SEPT98	–
10823	21MAR01	A



NOTES:

1. TRIM BOTH SIDES OF CABLE (ITEM 2) AS SHOWN IN DETAIL A.
2. DO NOT CLEAN FLUX OFF OF P1 AFTER SOLDERING. CLEANING AGENT COULD DAMAGE DISPLAY.

ITEM	PART NO.	DESCRIPTION	MARK	FIN	MATL
QTY. REQD.	PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015
ANGULAR DIMENSIONS 1/2°		

500A100A
USED ON MODEL

DRAWN A.REED DATE 24 AUG 98
CHKD A.REED DATE 9/13/98
MECH J.MAGINN DATE 9/10/98
ELEC J.CATON DATE 9/10/98

AMPLIFIER RESEARCH

DISPLAY ASSEMBLY 4 LINE VFD

DWG. NO. 1009903

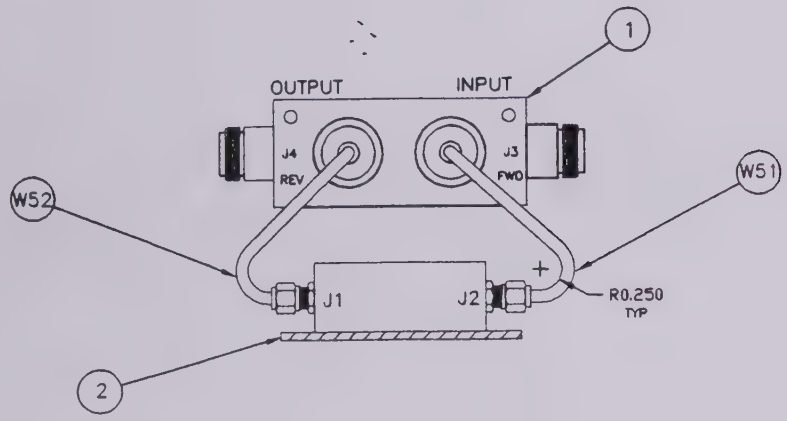
SCALE 1/1 | SHEET 1 OF 1 | REV. A

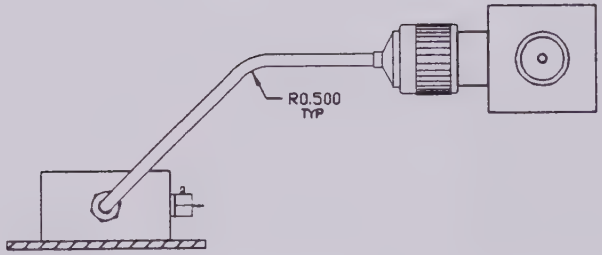
BILL NO: 1009903-501 REV: A U/M: EA DRAWING NO: ARC-B\1009903
DISPLAY ASSY

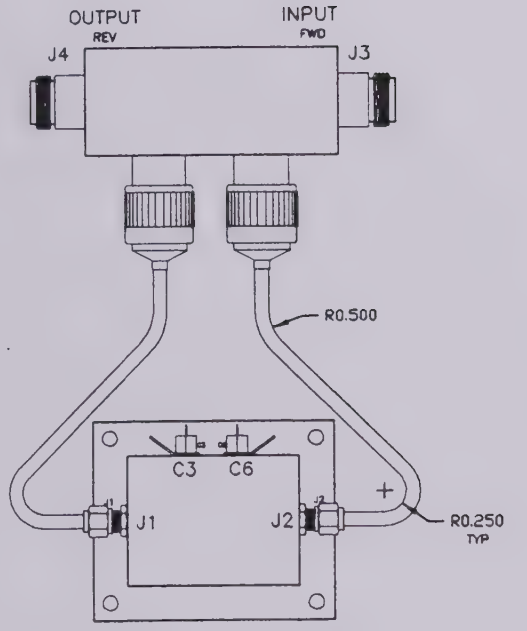
SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1009903	A	ASSY DWG,DISPLAY	EA	REF	ARC-C\1009903	
1500	41305		CONN,RECPT,14 PIN	EA	2.000	AMP\1-640442-4	J1 ,J2
1510	41300		CONN,LOCKING HEADER,STRAIGHT,14 PIN	EA	1.000	AMP\1-640454-4	P1
4200	66047		WIRE,BUSS,TINNED COPPER,22 AWG	EA	A/R	ALP\9022	W1
5000	69394		DISPLAY,VAC FLUORESCENT,4 ROWS,20 CHARACTERS	EA	1.000	NOR\CU20045SCPBU1J	1
5010	66244		CABLE,RIBBON,26 AWG,14 COND	IN	2.000	PNT\100PF26V14CR	2
5020	41306		CONN,COVER,DUST,14 PIN	EA	2.000	AMP\1-64550-4	3

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	N	DATE	RE
	EN	DATE	RE
REL NO. 1196-03	REL	26MAY99	–
	10290	15NOV99	A







NOTES:

FOR BOM: SEE 1009467-501

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN
		PARTS LIST			

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SCREW, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.05	±.015

ANGULAR DIMENSIONS ±2°

DRAWN A.REED DATE 02 DEC 98
CHKD A.REED DATE 26 MAY 99
MECH J.MAGINN DATE 18 JUNE 99
ELEC F.SCHIRK DATE 02 JUNE 99

100S1G4
USED ON MODEL

AMPLIFIER RESEARCH

ASSEMBLY DRAWING
DIRECTIONAL DETECTOR

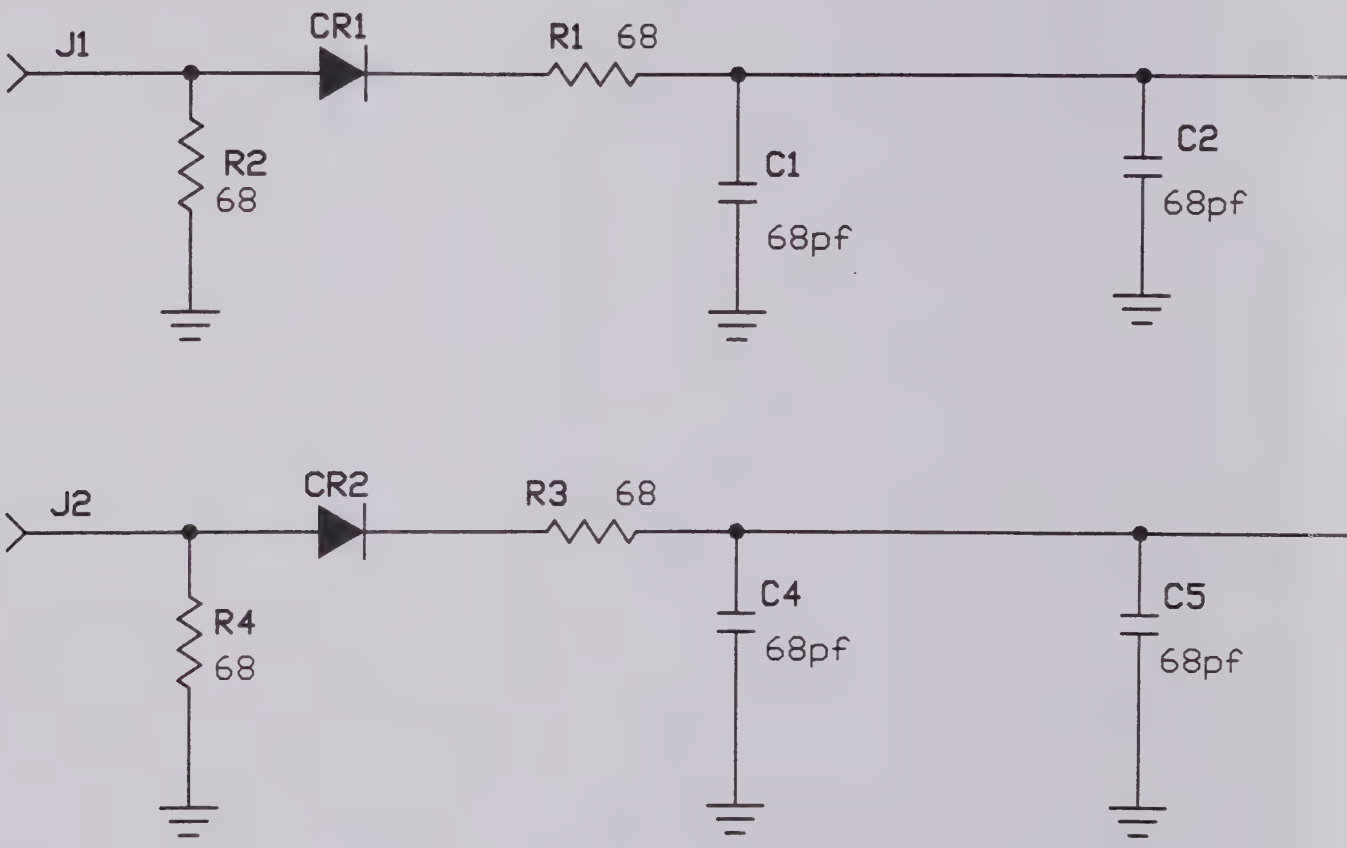
DWG. NO. 1009467

SCALE 1/1 SHEET 1 OF 1 REV A

BILL NO: 1009467-501 REV: - U/M: EA DRAWING NO: ARC-D\1009467
DIRECTIONAL DETR ASSY

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1009467	A	ASSY DWG,DIRECTIONAL DETR	EA	REF	ARC-D\1009467	
4200	20563	-	CABLE ASSY,COAX,SEMI-RIGID,N,SMA,5.5"	EA	2.000	ARC-A\1002494	W51 ,W52
5000	1009351-101	-	COUPLER,DUAL DIRECTIONAL,0.8-4.2Hz,50DB,600W	EA	1.000	ARC-A\1009351	1
5010	1009721-501	A	PWB ASSY,DETECTOR BD/100S1G4	EA	1.000	ARC-B\1009721	2

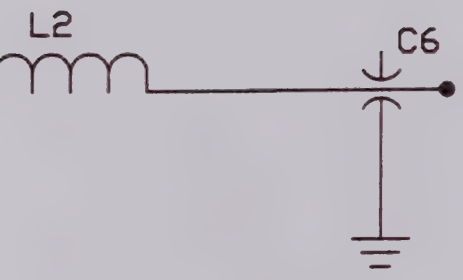
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ECN	DATE	REV
XXXX	29JUN98	1
XXXX	01SEP98	2
REL	28MAY99	–

REL NO 1196-03 →





QTY. REQD.	ITEM	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015

ANGULAR DIMENSIONS 1/2°

100S1G4
USED ON MODEL

DRAWN J.H.REED
DATE 29 JUNE 98

CHKD J.H.REED
DATE 28 MAY 99

MECH
DATE

ELEC
DATE

AMPLIFIER RESEARCH

SCHEMATIC
DUAL DETECTOR/100S1G4

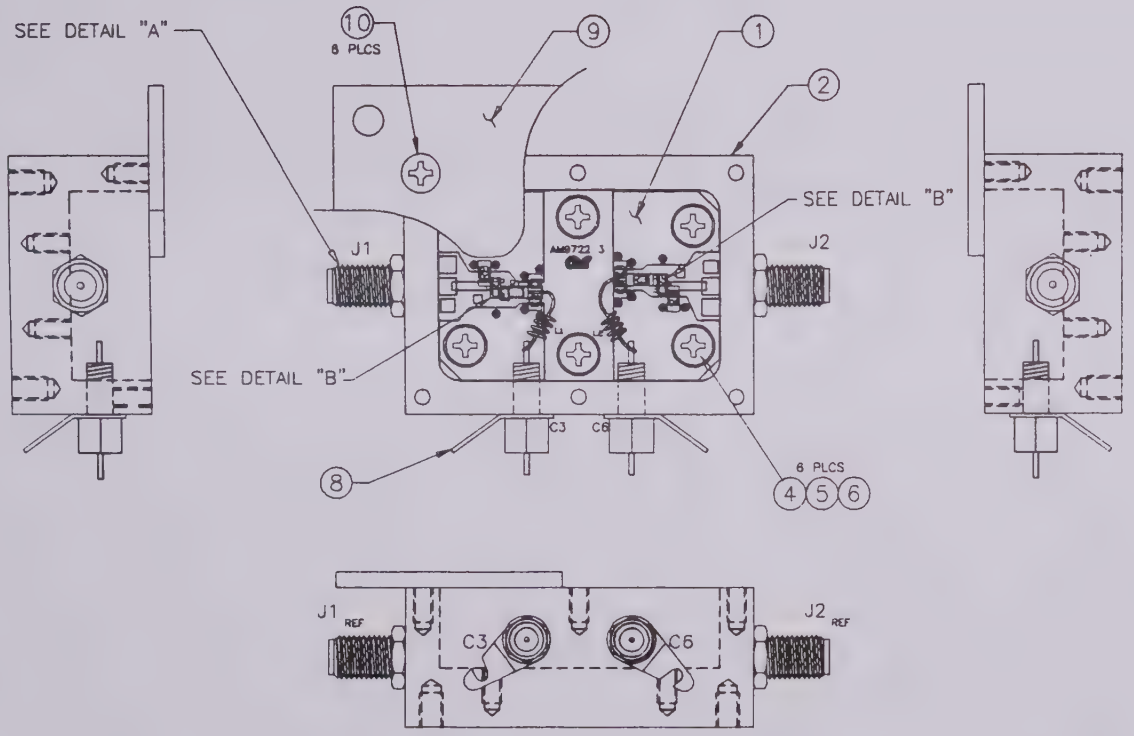
DWG. NO. 1009723

SCALE NONE | SHEET 1 OF 1 | REV. —

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ECN	DATE	RE
XXXX	29JUN98	
XXXX	31MAR99	
XXXX	09APR99	
REL	28MAY99	-

REL NO 1196-03

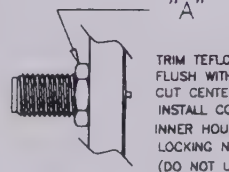


NOTES:

1.0 INSTALL PWB INTO HOUSING. TIGHTEN ALL PWB MOUNTING SCREWS BEFORE INSTALLATION OF COMPONENTS.

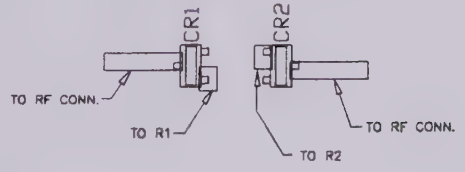
2.0 INSTALLATION OF CR1, CR2 TO BE DONE AT A STATIC APPROVED WORKSTATION.

DETAIL "A"



TRIM TEFLON OF PARTS J1, AND J2 FLUSH WITH CONNECTOR BODY. CUT CENTER PIN TO 0.075"(IN) INSTALL CONNECTOR FLUSH WITH INNER HOUSING WALL. TIGHTEN LOCKING NUT "A" SECURELY. (DO NOT USE SUPPLIED WASHER)

DETAIL "B"



FOR BOM SEE: 1009721-501

QTY. REQD.	ITEM	PART NO.	DESCRIPTION	MARK	FIN
		PARTS LIST			

UNLESS OTHERWISE SPECIFIED DO NOT SCALE DRAWING DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2 REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015
ANGULAR DIMENSIONS 1/2°		

DRAWN J.H.REED DATE 30 JUNE 98
CHKD J.H.REED DATE 28 MAY 99
MECH DATE
ELEC DATE

AMPLIFIER RESEARCH

PWB ASSEMBLY
DUAL DETECTOR/100S1G

DWG. NO. 1009721

SCALE 2/1 SHEET 1 OF 1 REV. —

100S1G4 USED ON MODEL

BILL NO: 1009721-501 REV: A U/M: EA DRAWING NO: ARC-B\1009721
PWB ASSY,DETECTOR BD/100S1G4

SEQ	PART NUMBER	REV	DESCRIPTION	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1009723	-	SCHEM DIAG,DETECTOR BD/100S1G4	EA	REF	ARC-B\1009723	
0020	1009721	-	ASSY DWG,DETECTOR BD/100S1G4	EA	REF	ARC-B\1009721	
0410	27261		CAPR,CHIP,68pF,10%,150V	EA	4.000	ATC\100A680KCA150X	C1 ,C2 C4 ,C5
0420	27098		CAPR,FEED-THRU,FILT,470PF,10%	EA	2.000	MET\FB2B-471GMV	C3 ,C6
0700	30042		DIODE,SCHOTTKY,DET,MICROWAVE	EA	2.000	H-P\HSMS-2850	CR1 ,CR2
1300	41243		CONN,COAX,BULKHD JACK,SMA,(F)	EA	2.000	DTA\1321000K82165	J1 ,J2
1800	1007507-102	-	INDUCTOR,AIR WOUND,.050ID,34GA,5T	EA	2.000	ARC-A\1007507	L1 ,L2
2710	55647-68R0J		RES,FXD,CHIP,68,5%,1/8W	EA	4.000	D-K\P68-ECT-ND	R1 ,R2 R3 ,R4
5000	1009722-101	-	PWB,DETECTOR BD/100S1G4	EA	1.000	ARC-B\1009722	1
5010	1009955-101	-	ENCLOSURE,DUAL DETECTOR,100S1G4	EA	1.000	ARC-B\1009955	2
5030	11010		SCREW,MACH,PAN HD,CROSS-REC,S/S,4-40 X .25	EA	6.000	\MS51957-13	4
5040	12047		WASH,LOCK,SPLIT,S/S,#4	EA	6.000	\MS35338-135	5
5050	12010		WASH,FLAT,S/S,#4,.250 OD X .125 ID X .022 THK	EA	6.000	\MS15795-803	6
5070	69101		LUG,SOLDER,BENT TONGUE,3/4 L,3/8 OD,1/4 STUD	EA	2.000	HHS\1496	8
5080	1009553-101	-	COVER,DETR	EA	1.000	ARC-B\1009553	9
5090	11085		SCREW,MACH,FLT HD,100 DEG,CROSS-REC,S/S,4-40 X.25	EA	6.000	\MS24693-C2	10

SECTION VI

RECOMMENDED SPARE PARTS

6.1 LEVEL OF MAINTENANCE

Three separate lists of parts are recommended for maintenance of the related amplifier. Each list will contain parts that will be required for repairs to be performed at a particular level of technical expertise and equipment needed to perform this level of maintenance. The three levels of maintenance are as follows.

Level 1—Technician Level

Performed at equipment location with connectorized items. Limited to replacement of printed wiring boards (PWBs), amplifier assemblies, fuses, and so forth. Requires qualified technical personnel. Suggested when down time must be minimized.

Level 2—Field Service/Shop Level

Parts replacement requiring minimum adjustment or alignment. Includes PWB repair, and replacement of controls, power supply components, fans, and individual Radio Frequency (RF) components that would not adversely affect the amplifier's alignment.

Level 3—Factory-Authorized Level

Repairs that require amplifier alignment or major adjustments. To be performed by a qualified technical staff in a properly instrumented laboratory.

Level 1

Spare Parts Listing For Model 120S1G3 (REV -)

12-Apr-01

Part Number	Description	Qty
35010	CKT BRKR,2 POLE,15A,220VAC	1
35020	FILT,LINE,15 AMP	1
35041	FUSE,NORMAL BLO,CER BODY,15A,2	2
69392	KNOB,KNURLED,BLACK,1 1/4 DIA,1	1

Please contact the AR Customer Service Department for current pricing.

Phone: 215-723-0275 Fax: 215-723-5688 Email: info@ar-amps.com

Level 2

Spare Parts Listing For Model 120S1G3 (REV -)

12-Apr-01

Part Number	Description	Qty
35010	CKT BRKR,2 POLE,15A,220VAC	1
1N4448	DIODE, SIGNAL, 75V PIV	2
1N5230A	DIODE,ZENER,4.7V,10%,500MW	1
30043	DIODE,ZENER,4.7V,SM	1
1N5231B	DIODE,ZENER,5.1V,5%,500MW	1
35020	FILT,LINE,15 AMP	1
35041	FUSE,NORMAL BLO,CER BODY,15A,2	2
69392	KNOB,KNURLED,BLACK,1 1/4 DIA,1	1
25079	PS,SWNG,15V,1200W,PFC,85-265VA	1
25037	PS,SWNG,24V @ 1.6A	1
25080	PS,SWNG,65W,+15V,-15V,+5V	1
1008596-101	PWB,OPERATE/CONTROL(OCB)	1
43040	RELAY,LO-PWR,DPDT,12VDC,360 OH	1
43046	RELAY,MED PWR,12VDC COIL,30A C	1
2N3904	XSTR,SWNG,NPN,40V,0.2A,1W	2
2N3906	XSTR,SWNG,PNP,40V,0.2A,1W	1

Please contact the AR Customer Service Department for current pricing.

Phone: 215-723-0275 Fax: 215-723-5688 Email: info@ar-amps.com

Level 3

Spare Parts Listing For Model 120S1G3 (REV -)

12-Apr-01

Part Number	Description	Qty
25035	ATTEN,V VAR,DC-5 GHZ	2
35010	CKT BRKR,2 POLE,15A,220VAC	1
1N4448	DIODE, SIGNAL, 75V PIV	2
1N5230A	DIODE,ZENER,4.7V,10%,500MW	1
30043	DIODE,ZENER,4.7V,SM	1
1N5231B	DIODE,ZENER,5.1V,5%,500MW	1
35020	FILT,LINE,15 AMP	1
35041	FUSE,NORMAL BLO,CER BODY,15A,2	2
69392	KNOB,KNURLED,BLACK,1 1/4 DIA,1	1
25079	PS,SWNG,15V,1200W,PFC,85-265VA	1
25037	PS,SWNG,24V @ 1.6A	1
25080	PS,SWNG,65W,+15V,-15V,+5V	1
1008596-101	PWB,OPERATE/CONTROL(OCB)	1
43040	RELAY,LO-PWR,DPDT,12VDC,360 OH	1
43046	RELAY,MED PWR,12VDC COIL,30A C	1
2N3904	XSTR,SWNG,NPN,40V,0.2A,1W	2
2N3906	XSTR,SWNG,PNP,40V,0.2A,1W	1

Please contact the AR Customer Service Department for current pricing.

Phone: 215-723-0275 Fax: 215-723-5688 Email: info@ar-amps.com

WARRANTIES: LIMITATION OF LIABILITY

Seller warrants (i) that seller has title to the goods sold and (ii) that Amplifiers, Antennas, Test Cells, Directional Couplers and Tripods will be free from defects in material and workmanship for a period of three (3) years from date of shipment shown on Amplifier Research invoice. Field Monitoring Equipment and Interference Generators will be free from defects in material and workmanship for a period of two (2) years from date of shipment. Vacuum tubes, traveling-wave tubes and other products will be free from defects in material and workmanship for a period of one (1) year. Seller's sole responsibility in fulfilling these warranties shall be to repair or replace any goods which do not conform to the foregoing warranties or, at seller's option, to give buyer credit for defective goods. The warranty is valid only when used in the country specified at time of order. Warranty service must be obtained from the repair facility designated at that time. If warranty service is not available in the country where the equipment is to be used then it must be returned to Amplifier Research. Warranty service will be provided only for defective goods which are returned within the warranty period, freight costs prepaid to Amplifier Research or its designated repair facility.

There are no other warranties, express or implied, including any warranty of merchantability or fitness. Seller shall not be responsible for any incidental or consequential damages arising from any breach of warranty.

No person other than an officer of Amplifier Research Corporation, has any authority to bind seller to any affirmation, representation or warranty except as specifically included in the preceding terms and conditions.

AMPLIFIER RESEARCH

MODEL NO. 120S1G3
SERIAL NO. 301941
TESTED BY P J G
DATE 7-23-01

TEST DATA SHEET

FREQ. (GHz)	POWER OUTPUT @ 1dB COMPRESSION (WATTS)	POWER OUTPUT SATURATED (WATTS) @ 0dBm INPUT	HARMONIC DISTORTION @ 100 WATTS
0.8	122	134	-25
1.0	149	156	-23
1.25	146	153	-28
1.5	142	141	-31
1.75	135	146	-34
2.0	117	134	-35
2.25	124	140	-36
2.5	128	133	-56
2.75	124	142	-42
3.0	104	127	-56

MINIMUM GAIN 55.4 dB @ 2.3 WATTS OUTPUT (at 2GHz)

FLATNESS ± <1.5 dB

OPEN TEST √ (√)

SHORT TEST √ (√)

STABILITY √ (√)

INPUT VSWR <2.0:1

SPURIOUS √ (√)

INPUT ATTEN. RANGE √ (√)

3rd ORDER INTERMOD √ (√)

LINE VOLTAGE PERFORMANCE √ (√)

REMOTE IEEE-488/RS-232 √ (√)

TEST EQUIPMENT	S/N
NETWORK ANALYZER	TEC-NA 1843
SIGNAL GENERATOR	TEC-SG 1843
SWEEP GENERATOR	TEC-SW 1843
POWER METER	TEC-PM 1410
SPECTRUM ANALYZER	TEC-SA 1756
OSCILLOSCOPE	TEC-OS -------
FIXED ATTEN. 40 dB	TEC-AT 1848
FIXED ATTEN. ---- dB	TEC-AT ------

TEST EQUIPMENT CALIBRATION TRACEABLE TO
NATIONAL INSTITUTE OF STANDARDS & TECHNOLOGY. (NIST)

1010948
REV1199

AMPLIFIER RESEARCH
In compliance to IEC 1010-1
Safety requirements of electrical equipment for laboratory use
Annex K

ROUTINE TESTS

Model : 1205IG3

Serial No. : 301941

Date : JUL 23 2001

Inspected By : P.J.G.

Tests: For equipment with working voltage up to 300 V

Protective earth resistance	Limit	
Apply 25 amps between protective terminal and ACCESSIBLE parts. Record resistance.	≤ 0.1 ohms	.05 ohms

Mains circuit insulation	(Circle one)	(√)
Apply voltage from the mains input to chassis for a period of time greater than two (2) seconds. No arcing or breakdown should occur.	1350 VAC 1900 VDC	✓

Floating input terminals	Record Voltage	(√)
Apply 1.5 times working voltage to floating input terminals, where applicable. No arcing or breakdown should occur.	—	—

20 Jul 2001 13:46:16

CH1 S21 LOG 1 dB/ REF 55 dB 3: 55.652 dB 3 000.000 003 MHz
CH2 S21 LOG 1 dB/ REF 51 dB 3: 51.894 dB



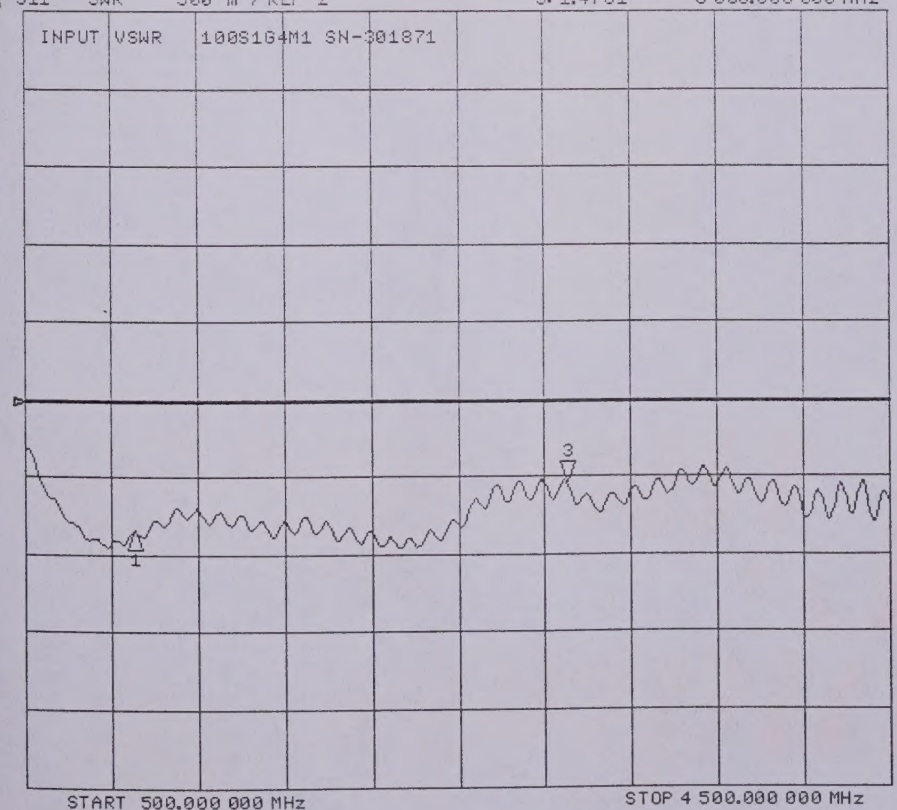
CH1 Markers
1: 54.066 dB
800.000 MHz

CH2 Markers
1: 51.445 dB
800.000 MHz

CH1 START 500.000 000 MHz STOP 4 500.000 000 MHz
CH2 START 500.000 000 MHz STOP 4 500.000 000 MHz

20 Jul 2001 13:47:39

CH1 S11 SWR 500 m / REF 2 3: 1.4781 3 000.000 000 MHz



CH1 Markers
1: 1.1563
1.00000 GHz

START 500.000 000 MHz STOP 4 500.000 000 MHz

